Chemical Week

September 8, 1956

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Now teamed in aluminum, Olin Mathieson, Revere Copper plan 180,000 tons/year plant in Ohio . . . p. 39

Communications class: they're learning to interpret technology for customers, stockholders . p. 56

Competing for researchers in today's tight market takes plenty of management ingenuity . . . p. 74

Ease of application is sparking soil fumigants' bid for bigger agricultural markets . . . . p. 90

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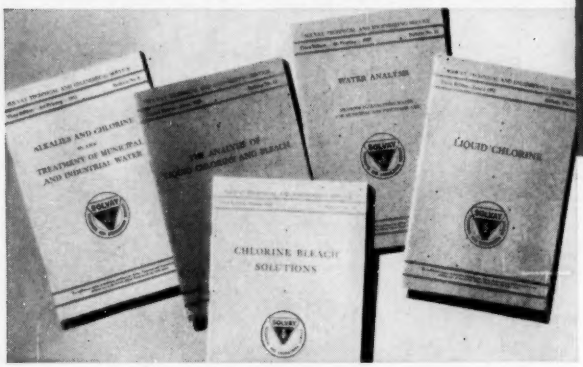

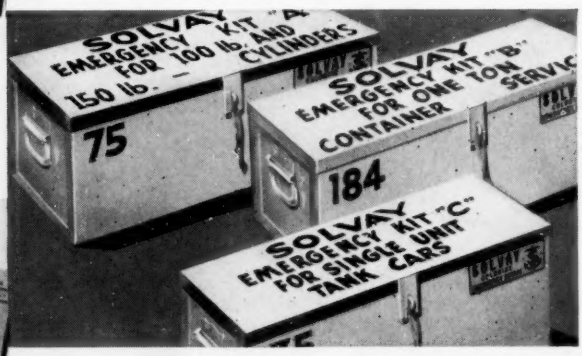
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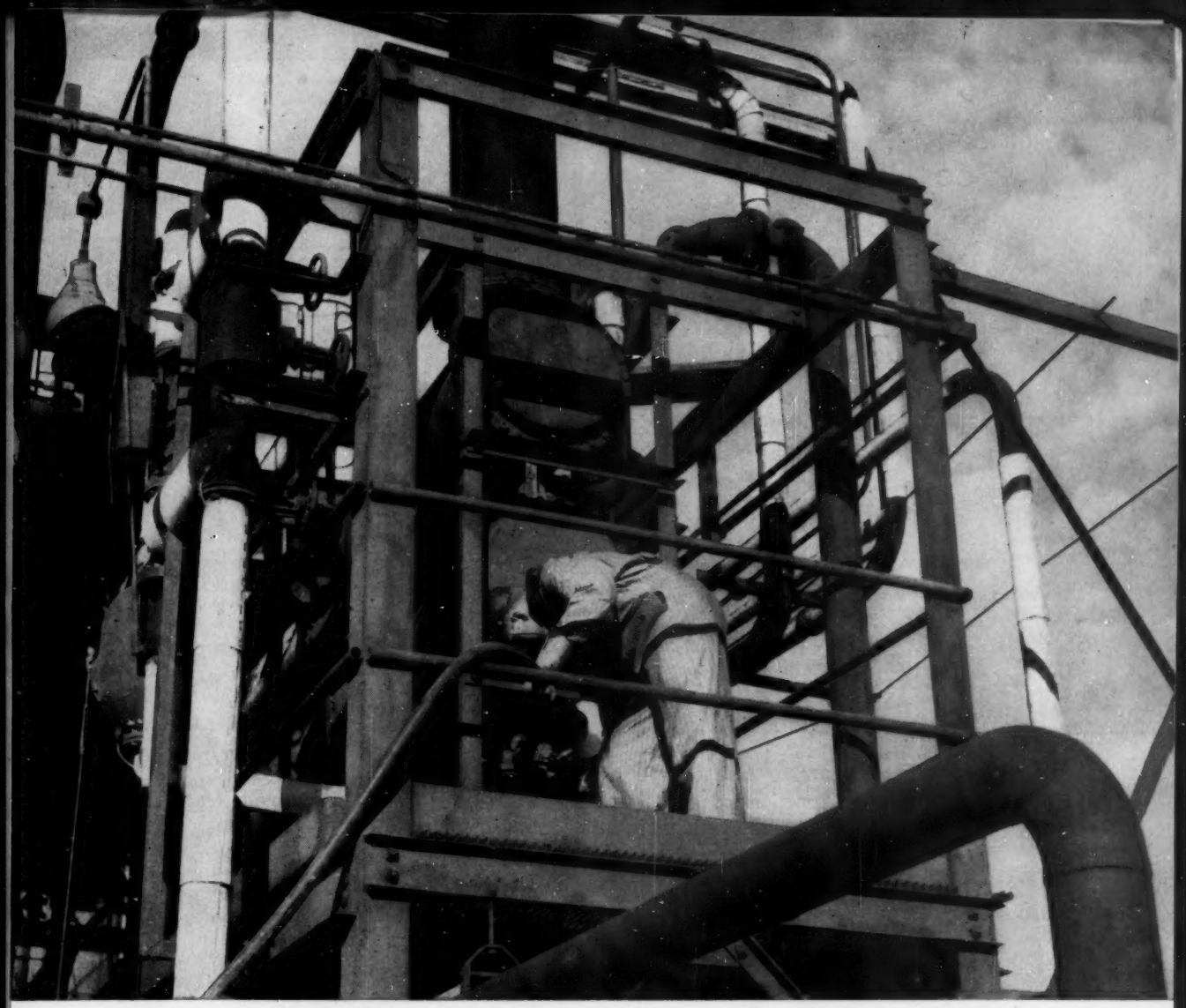

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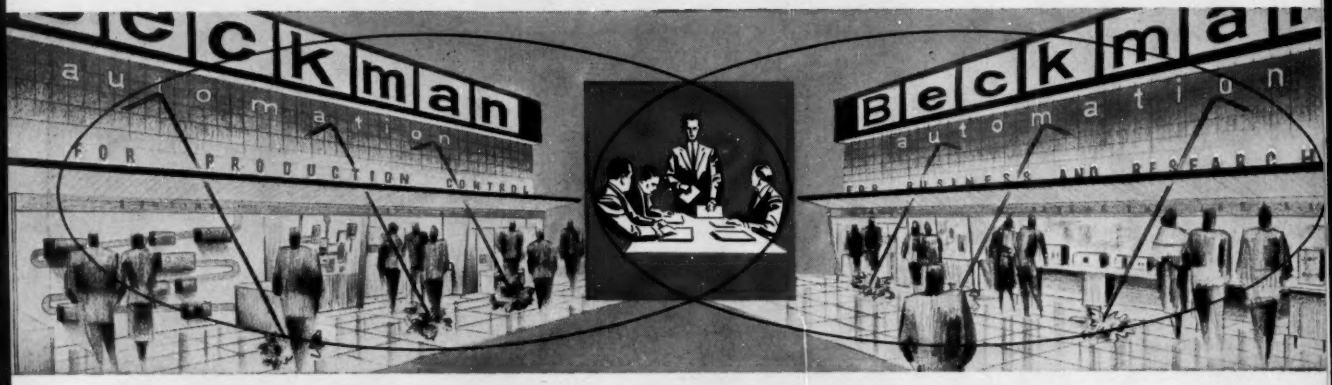

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Chemical Week

TOP OF THE WEEK

September 8, 1956

This week's shutdown of synthetic fabric mills isn't worrying most synthetic fiber makers. Actually, they're somewhat relieved .....p. 40

With extension of AEC's uranium contract limits, there's a rash of new producers aiming to set up shop .p. 41

Demurrage rates won't go up this year. ICC, besieged by protests from shippers, has turned down the railroads' request for an immediate hike .....p. 62

Coal chemical producers are set to use new techniques to upgrade coke-oven aromatics .....p. 115

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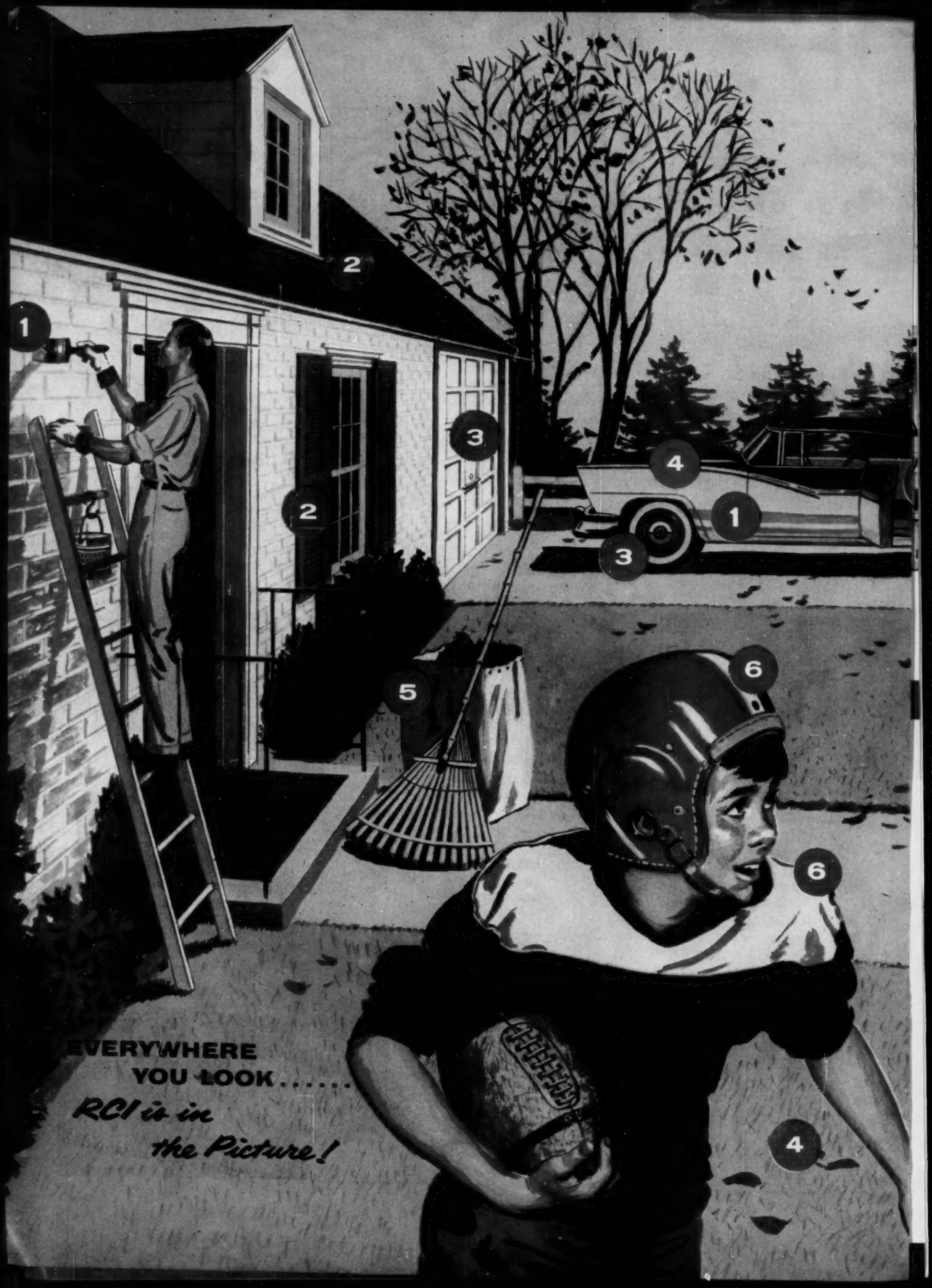
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FROM BRICKS TO BRAKES

important applications of RCI products

1. **RCI surface coating resins** – for durable exterior masonry paints Reichhold offers polyvinyl acetate emulsions with superior low temperature coalescence. For finer metal finishes RCI has recently introduced a *new* melamine-formaldehyde resin that produces high solids enamels with optimum gloss and hardness.

2. **RCI chemical colors** – lend brightness to asphalt shingles (via granule coating) . . . help give lasting beauty to many enamels and trim paints.

3. **RCI phenol-formaldehyde resins** – find major uses in strong water-resistant adhesives for exterior fir plywood and in durable auto brake linings.

4. **RCI phenol** – whether you make weed killers or use phenol in manufacturing engine oil additives, Reichhold can make fast delivery via drum or tank car wherever your plant is located.

5. **RCI plasticizers** – play a major role in the performance of many vinyls, including those used for auto upholstery and seat covers. (Incidentally, as shown in our illustration, a "retired" vinyl shower curtain can be sewn up into a fine big bag for jobs like collecting leaves.)

6. **RCI polyester resins** – combine with diisocyanate to produce polyurethane foams which are currently being tried out for many types of padding such as that required in sports equipment. Other RCI polyester resins provide the sturdy lightweight protection expected of modern football helmets.

Which of these materials do you need?

The next time you have a supply problem (or a technical problem) take a look at RCI. See where fast delivery of these quality-controlled RCI materials (and the additional ones listed with our signature) can help *you*.

In kettles like these – RCI is now producing its new line of aromatic solvent-soluble melamine-formaldehyde resins which give many improved properties to baking enamels for automobiles, appliances and other products.

Auto manufacturers – will find "high solids" enamels made with the new RCI melamine-formaldehyde resins give optimum gloss and hardness with a minimum number of spray coats.

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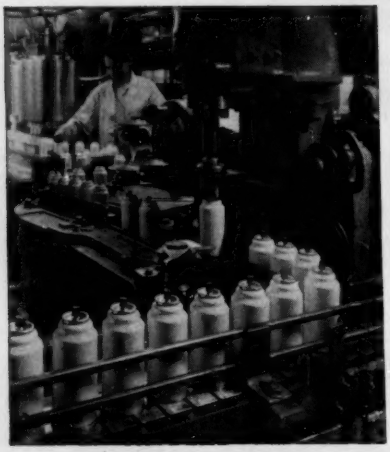

You don't need experience or equipment when custom fillers load your aerosol product

Here's more good news—you don't have to invest in expensive equipment to get into the aerosol market. There are a number of experienced fillers located throughout the country who have the know-how and necessary specialized equipment to do the manufacturing job for you.

These custom fillers can help you in many ways including product evaluation, formulation, testing, container selection and labeling, filling, packing and shipping.

If your product can be brushed, poured or sprayed, it may lend itself to aerosol packaging. Why not find out more about this sure way to improve your product's appeal—and sales? Mail the coupon—we'll send you complete information.

"30,000 aerosol units sold last year," reports the Drug and Cosmetic Department of a Chicago department store. Retailers all over the country agree that consumers are pre-sold on aerosols. To add new consumer appeal to your product, try aerosol packaging.

"Hair-set sales up 2,000% with aerosols," is reported from a Paoli, Pennsylvania, supermarket. Aerosol hair sprays have become one of today's best-selling cosmetic items. Aerosol packaging could add big volume sales to your product, too.

IN VOLUME AEROSOL PACKAGING

TAKE aerosol hair spray as an example. Du Pont's recent consumer survey revealed that use of hair spray by respondents had grown from only 2% in 1951 to more than 50% in 1955. Translate success stories like this for hair sprays, shaving cream, room deodorants, insecticides and many more products into sales volume and profit dollars. You'll have convincing evidence of the profit potential in aerosol packaging. Again and again new sales spark has been added to an old product and immediate consumer acceptance gained for a new one by putting it in an aerosol. You can profit, too, from the consumer appeal of aerosols by packaging your product in an aerosol dispenser.

Here's how Du Pont can help apply the sales-sparking aerosol idea to your product

One of the surest ways to succeed with an aerosol is to call in Du Pont to help you get started. Since the original aerosol insecticide was developed, Du Pont has worked closely with marketers and loaders to help produce top-quality products. Annual Du Pont market surveys spotlight trends in aerosol sales to help marketers and distributors. This accumulated experience of laboratory experts and marketing specialists is on tap to help you get started in aerosols.

In assisting you with your aerosol formulation problems, Du Pont can help select the best "Freon"* propellent for your product. "Freon" propellents are ideal for aerosols because they are safe—nonflammable, nonexplosive, virtually nontoxic. "Freon" propellents are pure—Du Pont's 25 years' experience manufacturing "Freon" compounds assures the utmost in purity and quality.

Find out more about aerosol packaging and what Du Pont can do to help increase consumer acceptance of your product. For more information or technical assistance, mail the coupon or write to E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, 2420-13 Nemours Building, Wilmington 98, Delaware.

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ATLAS

CHEMICALS DIVISION
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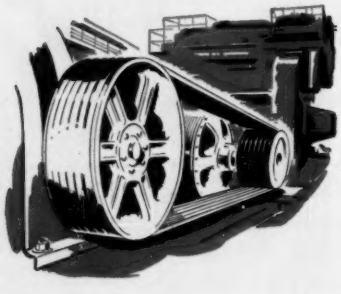
The chemical way to tame static electricity

Compounders of chemical specialties are now making antistatic sprays, wiping cloths, polishes and other products that help eliminate the age-old nuisance of static "shocks." The basic ingredient of these antistatic products is a surface active agent, related to emulsifiers and detergents, in which Atlas has pioneered for over fifteen years.

The problem of static electricity has been made more acute with the advent of man-made fibers and plastics. Garments may cling to the body because of it—or you may receive a shock after sliding across your auto seat cover, or after walking across a rug or plastic floor covering. Plastic articles attract dust and lint because of it. It is an expensive nuisance in mills where fibers are processed into fabrics.

Here are some of the many ways in which Atlas surface active materials are being used as antistatic agents.

Industrial applications for antistatic materials crop up nearly anywhere there's a power transmission belt

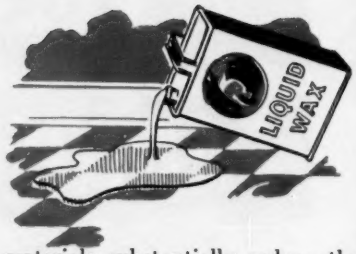


running over a pulley, dry materials going through ducts, or any of dozens of kinds of mechanical action. The amount of static charge generated may be so small as to be merely a nuisance to personnel . . . or it may be large enough to cause serious hazards.

Static on power belts can be effectively controlled by spraying with antistatic preparations containing a selected surfactant. A typical formula has a 5% concentration, in water, of Atlas G-3780, which is an especially effective antistatic agent.

Static is often produced by grinding, spraying or handling of materials such as resins and waxes. Take a tip from textile mill practice. When processing synthetic fibers . . . which are notorious static producers . . . the best system generally is to treat with an antistatic agent *ahead* of the process where static is generated. So if you're worried with static, the best bet usually is to introduce an antistatic agent at some point in the system. The choice of agent and method of application naturally depends on your specific problem. Our staff can normally come up with recommendations for one or more materials that will do the job for you, from our extensive line of non-ionic and ionic agents.

For Floor Polishes, several Atlas chemicals show promise in eliminating static charges on plastic floor coverings. Incorporated into liquid and self-polishing types of waxes, at levels of about 1% of total solids, these



materials substantially reduce the tendency of linoleum and other surfaces to attract dust and generate static.

Home Laundering of synthetic fabrics can render these materials static-free when a little antistatic agent is added to the last rinse. 1 to 2% of TWEEN® 20 (polyoxyethylene sorbitan monolaurate) does the job. For greater permanence, a compound such as Atlas G-3780 is recommended. Either of these chemicals is readily made up in water

solution and can be suitably perfumed for the application.

Further details and trial samples of Atlas products are available to companies interested in the manufacture and sale of antistatic specialties.

chem-memos

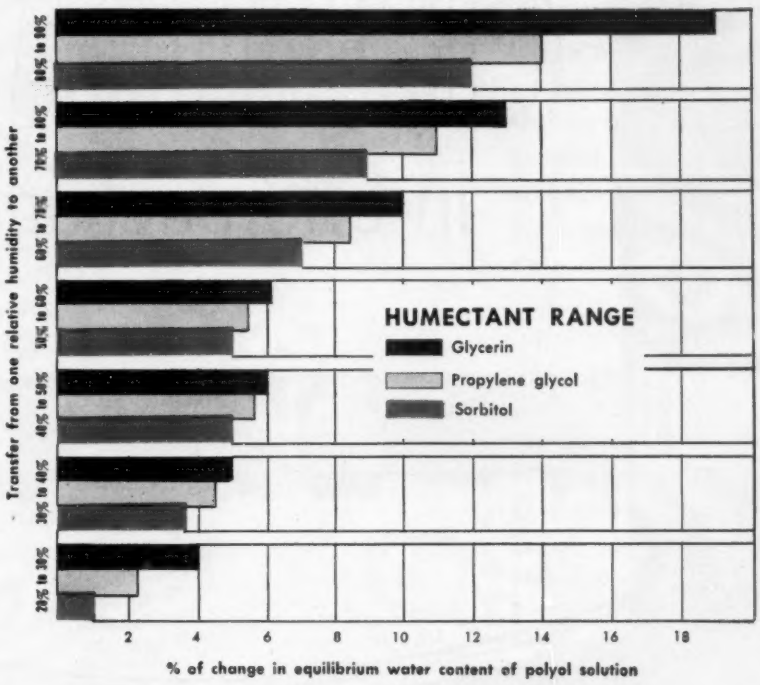
Sorbitol gives superior moisture protection

One of the most important characteristics of a moisture conditioning agent is its *humectant range*—that is, the extent to which it permits changes in moisture content. This property is especially significant when choosing such an agent or "humectant" for cosmetic creams, tobacco, paper, cellulose and glue specialities.

The accompanying chart illustrates sorbitol's narrow humectant range . . . its superior moisture stabilizing ability in comparison with other polyols. The length of the bars shows the change in equilibrium moisture content of a polyol solution when transferred from one relative humidity to another at the same temperature. Note that under all humidity conditions, sorbitol solutions exhibit smaller moisture change than other polyol solutions.

Moreover, sorbitol loses or gains moisture *at a slower rate* than other polyols when products in which it is used are transferred from one humidity condition to another.

For more detailed information on sorbitol's properties and applications, write for the booklet, "Atlas Sorbitol and Related Polyols."



Atlas test methods aid selection of agricultural emulsifiers

Manufacturers of emulsifiable concentrates of insecticides and herbicides must know exactly how their products will perform under field conditions. Laboratory test methods, however, may fail to produce the proper answers . . . either because they do not duplicate field conditions, or because lack of standardized techniques makes materials look good in one laboratory but fail miserably in another.

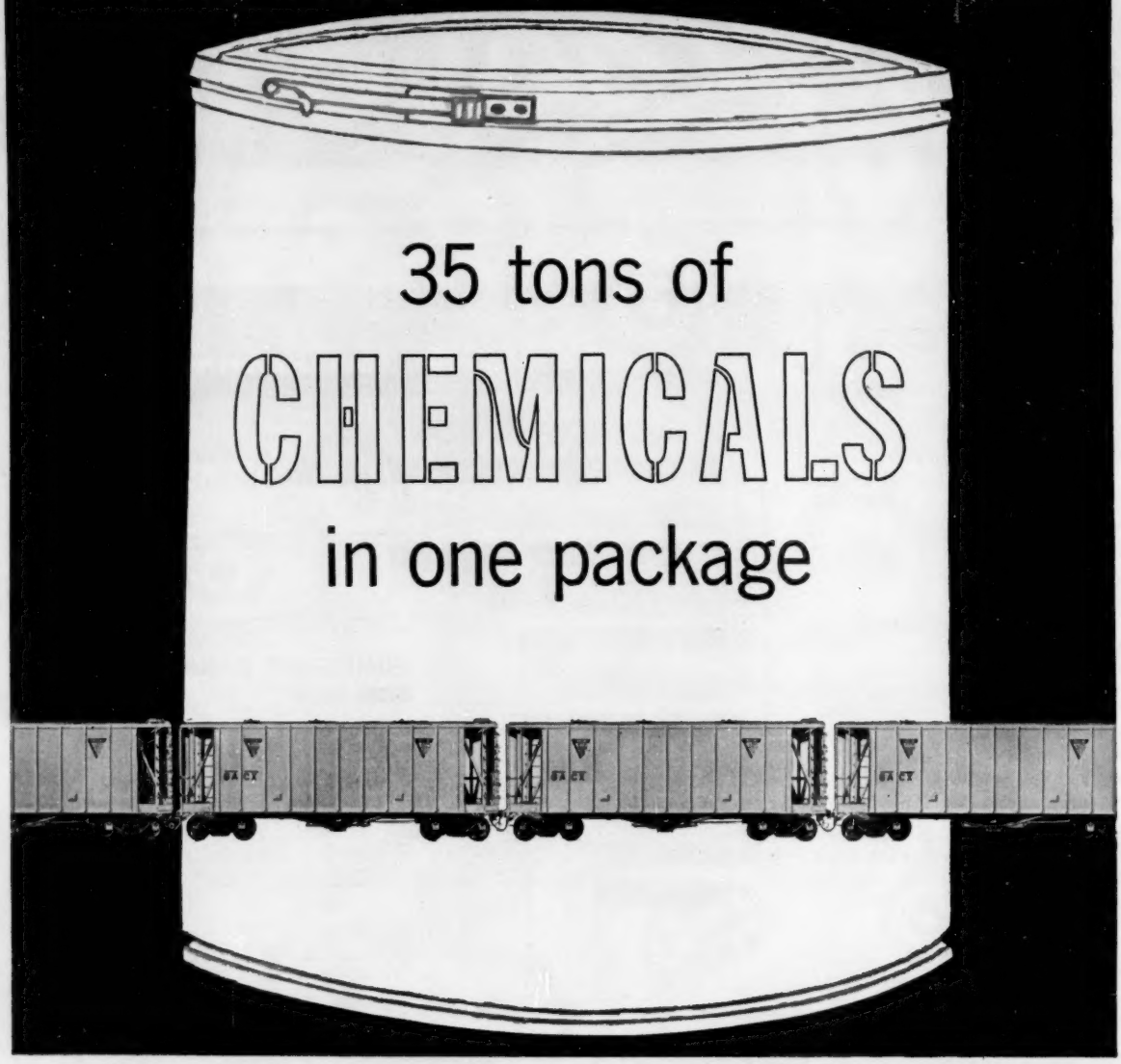
Atlas emulsion chemists have devised both techniques and equipment for testing these emulsions—delivering standard, reproducible results, all based on practical field conditions. Agitation, for example, is done on a motor-driven "shaking table", instead of being left to the mercy of the lab man's arm. The emulsion viewer simplifies the determination of the amount of separation which occurs at any predetermined time interval, providing a reproducible stability record on the formulation under test.

All Atlas tests are conducted in water hardnesses which will be met in the field, using water samples ranging from 50 ppm to 1000 ppm. Accelerated aging tests are used, to insure against corrosion of the drums or loss of efficiency. Dilution rates tested are those recommended for the formulation by the producer. However, bloom is not gained at the cost of loss of stability.

Formulators are finding out that standardized, practical testing pays off. By carefully outlining the complete conditions under which they want their concentrate to hold up, and then using standard reproducible tests in their own labs to find the proper emulsifier, they are getting better concentrates, lower costs, and, often, a partial solution to their inventory problems.

Technical papers on the test methods used at Atlas are available for the asking.

Flour, starch, plastics, sugar—these are a few of the many products successfully shipped in General American's Airslide Car.



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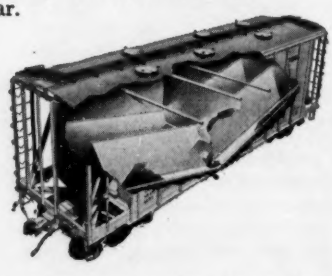

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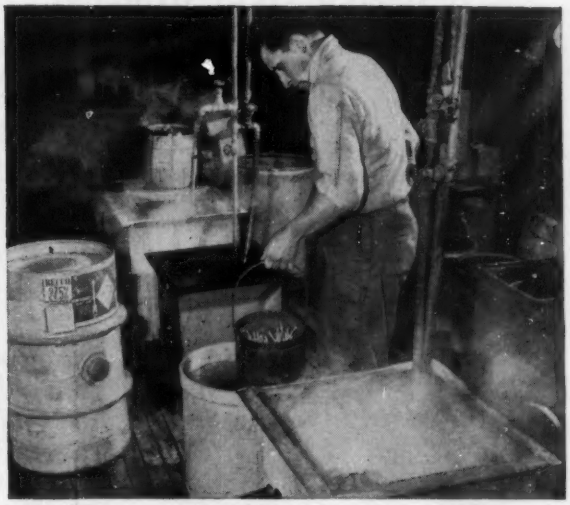
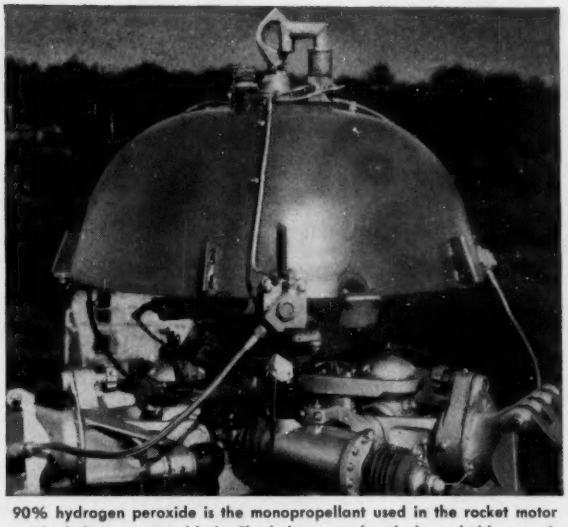
PEROXYGEN CHEMICALS CAN DO?

Butadiene, styrene, water, Becco potassium persulfate, dodecyl mercaptan, soap from resin of evergreens, are reacted for 12 to 14 hours under pressure and with agitation in the manufacture of synthetic rubber.



After electroplating with cadmium, small parts are dipped in an acid solution of hydrogen peroxide for maximum brightness.



90% hydrogen peroxide is the monopropellant used in the rocket motor on the helicopter rotor blade. The hub-mounted tank shown holds enough fuel for 6 minutes of full rocket power-assist.

Drawing from photomicrograph showing tiny spines of rabbit fur which, by carroting with a mixture of Becco Hydrogen Peroxide and other chemicals and subsequent shrinking, form felt.

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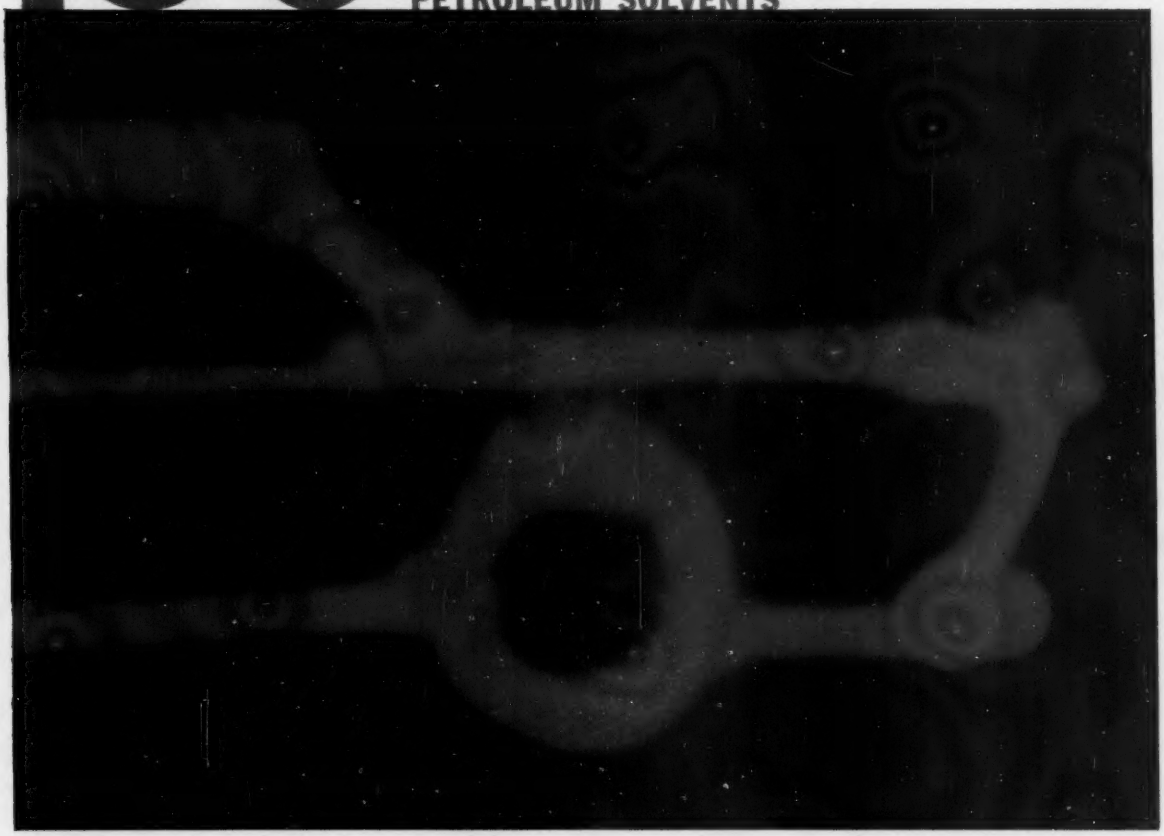

Behind Koppers successful solutions to every type of industrial air pollution problem lies three-quarters of a century of research and development in this country and abroad. From all this "know-how" come the basic types of gas cleaning units, produced by Koppers, that can solve any gas cleaning problem you may have.

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To drive your costs down even further in the solution of gas cleaning problems, Koppers carries on a never-ending research program . . . creating new gas cleaning techniques . . . finding out more and more about the properties and composition of materials that pollute the air. That's the job of Koppers' multi-million dollar research center at Verona, Pa.

Constant development of improved equipment and advanced design is the job of Koppers' Mechanical Development Laboratory at Baltimore. Backing up all this research is a sixty-year study by Koppers of current American and European gas cleaning techniques.

You profit by all this knowledge and research because it enables the Koppers engineer to recommend, without bias, the most efficient, most economical solution to your specific gas cleaning problem. If you have a problem, write to KOPPERS COMPANY, INC., Metal Products Division, Industrial Gas Cleaning Dept., 4709 Scott Street, Baltimore 3, Md.

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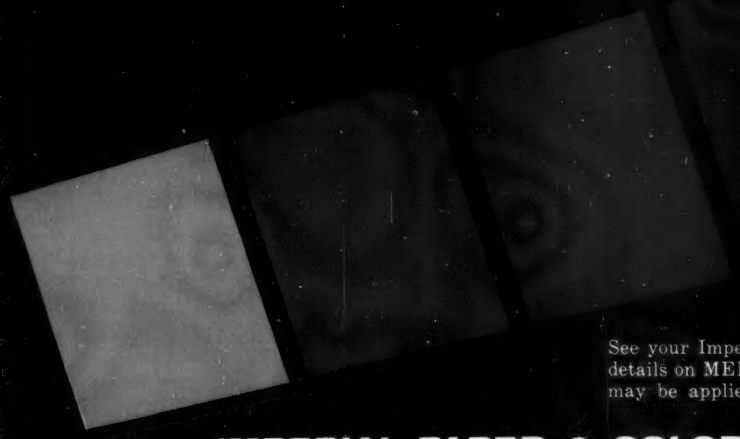

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CHEMICALS OUTLOOK

September, 1956

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

WYANDOTTE SODA ASH CAPACITY UP 32%

Growth is the active ingredient in Wyandotte's daily activities, as well as in our long-range program. In addition to a new $8 million manufacturing plant (announced last month) near Baton Rouge, La., the growth factor has resulted in greatly increased production at both Wyandotte's North and South Plants at Wyandotte, Michigan.

Take Soda Ash, for example. Production efficiencies at the North Plant, coupled with extensive modernizing -- involving the installation of the latest and most efficient new equipment at our South Plant -- have resulted in a current capacity of Soda Ash 32% in excess of one year ago.

Our plant modernization program has not only resulted in increased production, but improved quality control and product uniformity. Even more important, it enables Wyandotte to stay ahead of the needs of our many customers who depend upon us as a source for Soda Ash and other chemical raw materials.

To demonstrate how this affects the Wyandotte position in Soda Ash, bear in mind that the natural growth of Soda Ash consumption has been increasing at a rate of approximately 5% a year over the last several years. It is estimated that by 1960, six-million tons of Soda Ash per year will be required . . . this is an increase of approximately 20%. Wyandotte's 32% increase, effected this year, enhances our position in this market.

Yet, growth never stops at Wyandotte; if it did, we would lose our most important active ingredient.

A helpful 96-page book on Wyandotte Soda Ash is available, and it's packed with product and application information, technical data, sampling methods, tips on handling and storage. If you haven't already received your copy, write us on your company letterhead . . . the supply is limited.

GET YOUR ANTIFREEZE EARLY

Before the mercury drops to freezing, have your car protected with antifreeze. Ethylene glycol-type antifreeze is your best buy. Because of its higher boiling point, you can use high temperature thermostats for better results from car heaters, and you don't have to worry about losing your antifreeze when driving your car in heavy traffic or in mountain areas on warm days.

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In Plastics—If you premix or liquid mold in reinforced plastics, an ASP filler will put you in line for improved properties, excellent finish, low costs.

In Adhesives—ASP additives pave the way for paper converters and other adhesives users to better their picture in production, quality, costs.

In Printing Inks—ASP fillers and extenders hold process pluses: excellent wetting, dispersion, suspension; emulsification and water-breakdown resistance; printing press superiority.

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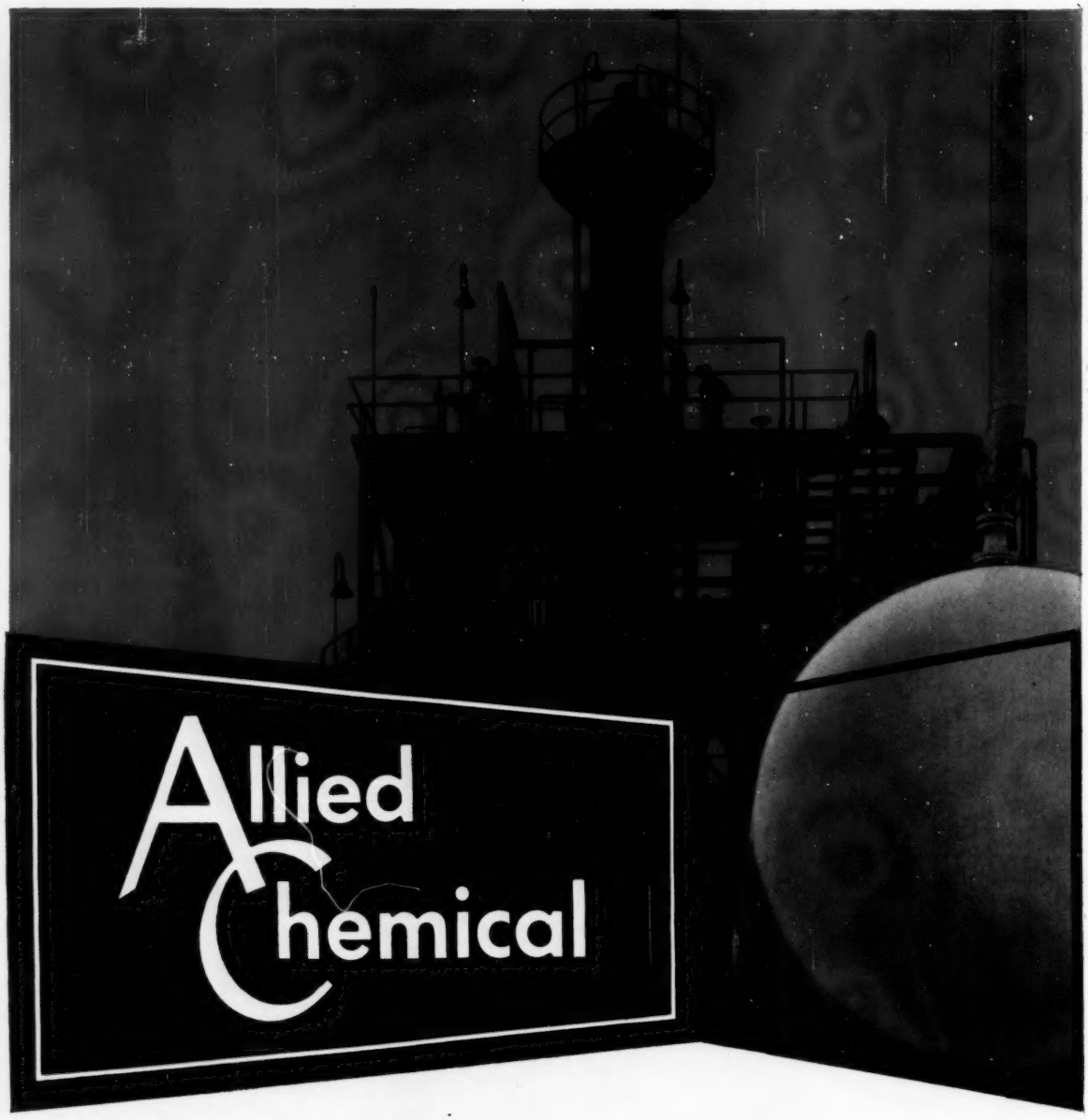

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CHEMICAL WEEK
September 8, 1956

Inflation talk is filling the air again. Opinion, blossoming on top of the Federal Reserve's not unexpected discount rate hike, is sharply divided on whether the U.S. is now headed for another go-round of sky-rocketing prices after nearly a year of relatively stable conditions. The board reported last week that consumer prices are rising, at midyear stood 6% above the level of a year ago. Industrial prices are up, too, pushed largely by increased steel prices passed on by equipment and building suppliers.

Will prices go any higher? Federal Reserve officials think they will, predict a booming fourth quarter. The Administration, however, says things are under control, points to revised budget forecasts showing lower revenue than expected.

Vital to the picture are optimistic predictions of booming business by auto producers and probable price hikes by the expansion-minded steel industry. If steel fails, as expected, to get the fast tax write-offs now being considered by the Office of Defense Mobilization, steel prices will likely be boosted to pay for increased capacity. Auto makers, looking at decreasing inventories of unsold cars in dealers' showrooms, expect plenty of interest in next year's models.

Chemical companies will keep up with the pace. Plenty of orders are already piling up for the fourth quarter, and chemical producers generally expect to pass increased costs of plants and equipment along to customers. In addition, sales in nearly all segments of the industry are running ahead of last year's and those that fell behind during the steel strike are catching up. Predicts one chemical executive: "Before prices level off again, there will be an 11% increase in the cost of living."

•

Sale of General Aniline & Film is several months off. The Office of Alien Property's position that it is now free to sell GAF stock (*Business Newsletter, Aug. 4*) is strengthened by the U.S. Court of Appeals' dismissal of Interhandel's request for review of its recovery suit by the full nine-judge panel, but preparations for the sale will be time-consuming.

First step will be a directive from OAP to GAF's board of directors telling it to file a registration statement with the Securities & Exchange Commission. After that, two sets of legal counsel will be appointed—one to represent the company, the other to represent the interest of the unknown final purchaser. When this is done, GAF will prepare an exhaustive prospectus of the company, a job that could take many months, and the prospectus will be certified.

From there on, the job will be a round of sale offers, bid-taking, plant visits, and review by the U.S. Attorney General. At this point, observers say, there's just no way of knowing when the government will direct GAF to start work on the registration statements or how long it will take for the preparation and review by OAP. Once the registration is submitted to SEC, though, past experience indicates a pretty definite timetable: sale ought to follow filing with SEC by about two months.

The joint proposal submitted to AEC by Koppers and Kennecott Copper (see p. 43), under which the two would prepare 5,000 tons/year of uranium salts as part of the Atomic Energy Commission's feed materials program, has been described by one Kennecott official as a case of "our research" and Koppers' plant know-how.

The project will cost an estimated $50 million, to be divided equally between the two firms, is expected to be let for contract Oct. 1. Probable location: the Midwest.

The two companies are now reported to be studying some 27 different approaches to salt production, and are rapidly increasing activity of the staff nucleus, which has been working on uranium feed materials for some time, in Salt Lake City at Kennecott's research center.

Another AEC project is changing operating hands. Procter & Gamble Defense Corp. (a subsidiary of the soap company), which has run AEC's Pantex Ordnance Plant at Amarillo since 1951, is turning over operation to Mason & Hanger-Silas Mason Co. (New York) and Lexington, Ky. Procter & Gamble had requested that it be so relieved.

•

Offers by Merck and Pfizer of aid to India's chemical industry have been termed "unsatisfactory" by the Indian government. According to the general superintendent of India's government-managed penicillin plant near Poona in the Bombay state, India will take up a Soviet offer to provide a series of chemical and pharmaceutical factories. This "most handsome" offer followed a tour of a team of Russian chemists, technicians and administrators of Indian facilities, will be followed up this week by a reciprocal tour by the Indians.

The Russian offer, it is said, was considered only after aid requests to the United Nations and to Merck and Pfizer had met with "unsatisfactory responses." The American firms reportedly offered "easy terms" provided they were permitted to set up their own plants in India without Indian (private or government) capital participation. Too, Indian officials complained that during a recent visit to the U.S., drug processes were kept secret from them.

•

Hooker Electrochemical's projected research lab will be realized after all. The $1.5-million project, to be located at Grand Island, N.Y., was held up when the town board reserved decision on a proposed zoning amendment to permit construction of industrial facilities (*Business Newsletter, Aug. 18*). Now, after fears of explosion prompted by the recent Olin Mathieson blast at Niagara Falls have abated, the board has unanimously voted the amendment. Hooker will begin construction within a year.

Also in western New York Carbide and Carbon will build a new plant at Niagara Falls, to reportedly triple the firm's hydroxyethel cellulose capacity.

Better cigars have one thing in common — they burn with a long, solid ash. The quality of the tobacco leaf used for the wrapper is a key factor.

Most wrapper leaf is grown in fields protected from the sun by acres of cotton shade cloth. This filters out harsh radiation, without interfering with rainfall or the natural "breathing" cycle.

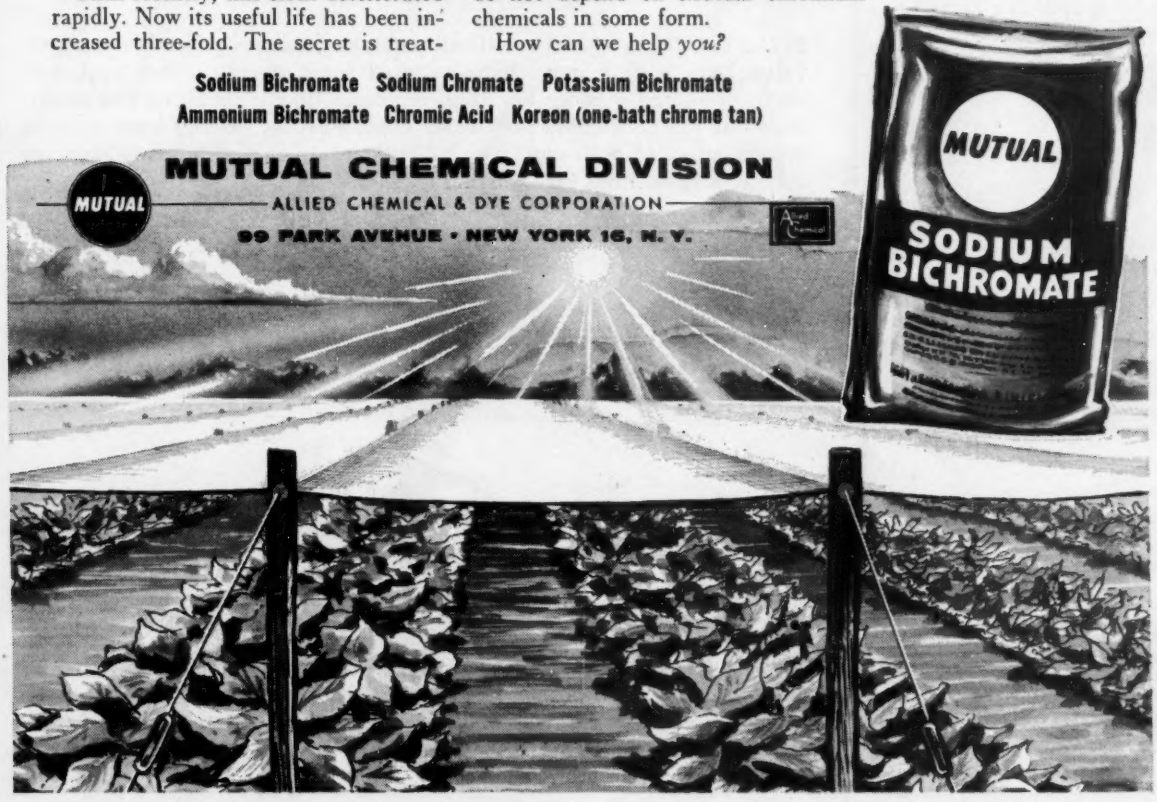
Until recently, this cloth deteriorated rapidly. Now its useful life has been increased three-fold. The secret is treatment of the cloth with solutions of lead acetate and bichromate, leaving a precipitate of ultra-violet radiation-resistant lead chromate.

Another method is soaking in a resin emulsion of lead chromate. In either case you can recognize treated cloth by its bright yellow color.

Actually, there are few industries that do not depend on Mutual chromium chemicals in some form.

How can we help *you?*

Sodium Bichromate Sodium Chromate Potassium Bichromate
Ammonium Bichromate Chromic Acid Koreon (one-bath chrome tan)



How four tough, diverse chemical packaging jobs were solved with Bemis Bags...

modified soda ash

problem: Develop a shipping container with special properties to resist the corrosive action of the contents... and to cost less than the rigid containers previously used.

solution: A special multiwall paper bag, made by Bemis... a sewn valve type with a polyethylene-coated inner sheet... that cost only about one-third as much per hundredweight (including filling and closing labor) as the containers previously used. Further savings were made in storage space of both empty and filled containers and in lower shipping costs due to reduced tare weight.

---

powdered aluminum

problem: The product must be protected against moisture and the shipping container must also be tough enough to stand up in export shipment.

solution: Bemis Waterproof (laminated-textile) Bags, which gave the necessary moisture protection and the required durability (they're the toughest shipping bags made). Furthermore, they save the shipper a lot of money, as the bags cost about 40 cents each, as compared with $1.25 for drums of equal capacity. There is also a substantial saving in empty container storage space.

polystyrene crystals

problem: Develop a shipping container that will (a) keep the polystyrene crystals entirely free from foreign matter, even down to lint particles, (b) withstand the rigors of export shipment, involving multiple handling, exposure, etc., and (c) cost less than the double-packaging (with overslips) previously used.

solution: A special type of laminated-textile valve bag developed by Bemis. The bag is constructed of tough burlap laminated between two types of special paper . . . providing ample strength, resistance to abrasion and freedom from lint. An ingenious method of sewing prevents burlap lint from getting into the polystyrene. Substantial savings are made on every bag shipped, not only on bag cost but also on labor.

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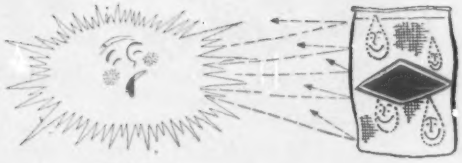
resin beads

problem: Find a lower cost, easier handling shipping container for ion exchange resin beads in which the moisture content must be maintained at its original approximate 45%. The material was previously shipped in fiber drums.



solution: A Bemis Waterproof (laminated textile) Bag, with a loose poly liner. After being filled, the liner is tie-closed and the burlap bag is closed by sewing. Advantages—Necessary moisture content is retained. Shipping weight is substantially reduced. Bags are more easily handled and require less unloading time. Drum disposal problem is eliminated. There is a storage space saving of 30% on filled bags and an even greater saving in empty container storage space.

Whether your shipping container problems are similar to any of these . . . or far removed from them . . . it's likely that Bemis can help you reach a money-saving solution. Write, wire or phone us. You will soon know whether we can help you.

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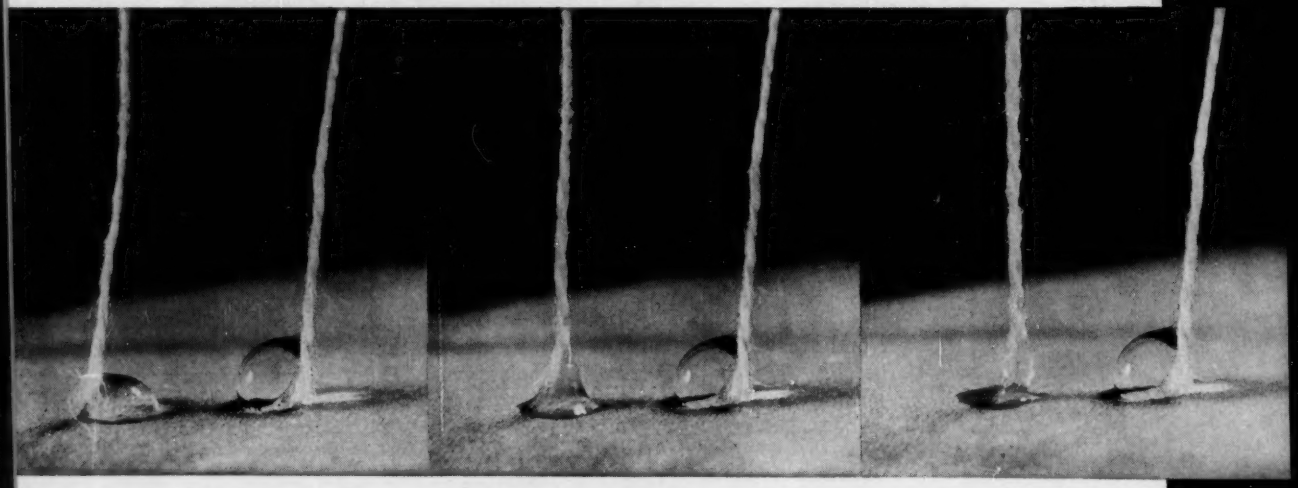


Wetting Agent

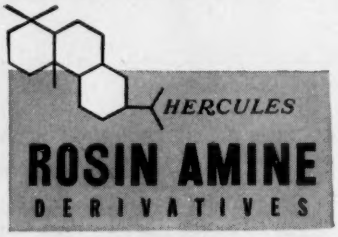
EXAMPLE: *Fiber Treatment*

This series of microphotographs shows a thirsty fiber. Treated with Polyrad®—a Rosin Amine D* derivative—the fiber at left absorbs a drop of water in a matter of seconds; the untreated fiber on the right still resists wetting. Treating the fiber with an aqueous solution of Polyrad, followed by air-drying, has resulted in the phenomenon of re-wetting—or "wicking action." RAD derivatives also show substantive adsorption to cellulosic materials, another property that enhances their wetting ability in fiber processing.

Surface-active Polyrad is nonionic in alkaline media and cationic in acidic media. Its properties of detergency, reduction of surface and interfacial tension suggest other applications in fiber processing as scouring agents, dye assistants, softeners, antistatic and delustering agents. These surface-active properties also make RAD derivatives useful in other fields as solubilizers, dispersing agents, and emulsifiers.

In addition, RAD adsorbs to metallic and siliceous surfaces, and also controls microbiological organisms. The amine derivatives are available in oil-soluble, water-soluble, and acid-soluble types.

If you have a processing problem, these chemical building blocks may hold the answer. We'll be glad to send you detailed technical data.



NA56-5

Pine Chemicals Division, Naval Stores Department

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ABOUT THIS PHOTOGRAPH—This is another in a series of photographic impressions of Hercules rosin amine derivatives in action as captured by Bernard Hoffman, well-known science photographer. The photograph above, of a single fiber the thickness of a hair, is magnified 110 times. It was shot at an original magnification of 45 diameters, using a Gamma microscope camera with a Micro Tessar lens. Distance from the subject was ¼ of an inch with a critical depth of focus of 1/32 of an inch.

OPINION

Right Flood, Wrong Mine

TO THE EDITOR: In Business Newsletter of Aug. 4 you state: "Damage from a flood that washed out the only bridge leading to Howe Sound's cobalt-producing Blackbird Mine last May has still not been repaired. As a result, the mine has been shut down. . ."

There has been no bridge washout that has interrupted production at our Blackbird property, and the mine has been operating continuously.

WILLIAM T. HOLMES
Secretary-Treasurer
Howe Sound Co.
New York

We were about 20 miles off base. There was a serious washout, but it affected the Twin Peaks Mine belonging to Idaho Consolidated Mining Co., not Howe Sound's nearby Blackbird Mine.—ED.

Dubious About FMB

TO THE EDITOR: [Re] . . . the article (*July 21*) on the ruling of the Federal Maritime Board as to the conference operating from Pacific coast ports to Europe.

. . . The tone of your article is optimistic concerning an apparent change in the attitude of the Federal Maritime Board towards restricting the steamship conferences in arbitrary treatment of the freight-rate question, and also for use of the exclusive patronage conference contract rate system.

Insofar as the Federal Maritime Board is concerned, I do not share your opinion at all. For instance, you speak of the board making two rulings against similar contract rate agreements within the past year. In one of these instances, two members of the three-member board issued a ruling that in the trade from Japan to U.S. Pacific Coast ports there was not a competitive need for the use of the exclusive patronage contract rate system by the conference lines. The chairman of the board vigorously dissented even from that opinion.

The board, either as to the other members or the chairman, did not hold, as we contend, that the conference contract system was unlawful, but rather simply that it was not required by the conference lines to meet the competitive situation existing in that particular trade.

In the present instance about which you write, the board has said in effect that the position now taken by the conference lines with reference to an interpretation of the contract must of necessity represent a meeting of the minds or agreement between the lines concerning this particular matter—that section 15 of the 1916 Shipping Act requires all agreements to be submitted to the Federal Maritime Board and approved by it before the matters agreed to could legally be acted upon. There is nothing to say that if these particular lines should file an agreement to give this different interpretation to their contract, or to change the contract form so that it would state that shippers who sign such contracts were bound on not only c.i.f. and c. & f. shipments, but also on f.o.b. and f.a.s. shipments, the board would approve this new agreement. In that case, the shippers would be right where they are and have been during the many years this conference contract rate system has been used.

I am optimistic that the time is not far off when shippers can expect the steamship lines serving American ports to take a different attitude towards the establishment of freight rates, particularly from a competitive standpoint.

My optimism is based on the fact that we have an order of the board favorable to the conferences with respect to the conference contract rate system on appeal with the U.S. Circuit Court of Appeals in Washington. We think a decision will soon be rendered by this court.

We consider it almost certain that, whatever the decision, it will be appealed to the U.S. Supreme Court. Because of the fact that an injunction is running in this matter, we expect action by the Supreme Court within 60 or 90 days after an appeal is filed. We are most confident that the U.S. Supreme Court will rule against the conference in the matter, just as it has done in the previous instance.

We hope this time that the Supreme Court will deal with the basic legal question involved and that [its decision] will be broad [enough so] that the board will have no choice but to ban the continued use of the exclusive patronage conference contract dual rate system on American trade routes.

I feel that you most likely understand the situation, but nonetheless thought I would write a note to set up the points that occurred to me when reading the article referred to, and which otherwise is very good.

M. S. CRINKLEY
Executive Vice-President
Isbrandtsen Co. Inc.
New York

Plant Cleanliness

TO THE EDITOR: I'd like very much to express my appreciation for the fine write-up in *CW* (*July 21*) on American Cynamid's program in dermatitis prevention. As is evident from the story, industry today is taking measures as never before to combat the potentially serious threat of occupational skin diseases. To illustrate some of these measures is the purpose of the nationwide educational campaign being sponsored by our client, the Assn. of American Soap & Glycerine Producers, Inc. . . .

In view of the scope and importance of this work—which will include further "case histories," the gathering of factual data on dermatitis incidence by questionnaire, and the development of intraplant employee educational programs—we were naturally disappointed that *CW* did not mention the association's contributions to this vital phase of industrial health.

You will undoubtedly receive correspondence from industrial sources interested in learning how best to adapt principles of plant cleanliness to particular situations. In this connection . . . a concise, yet comprehensive, booklet on the subject has been prepared by Dr. Louis Schwartz, one of

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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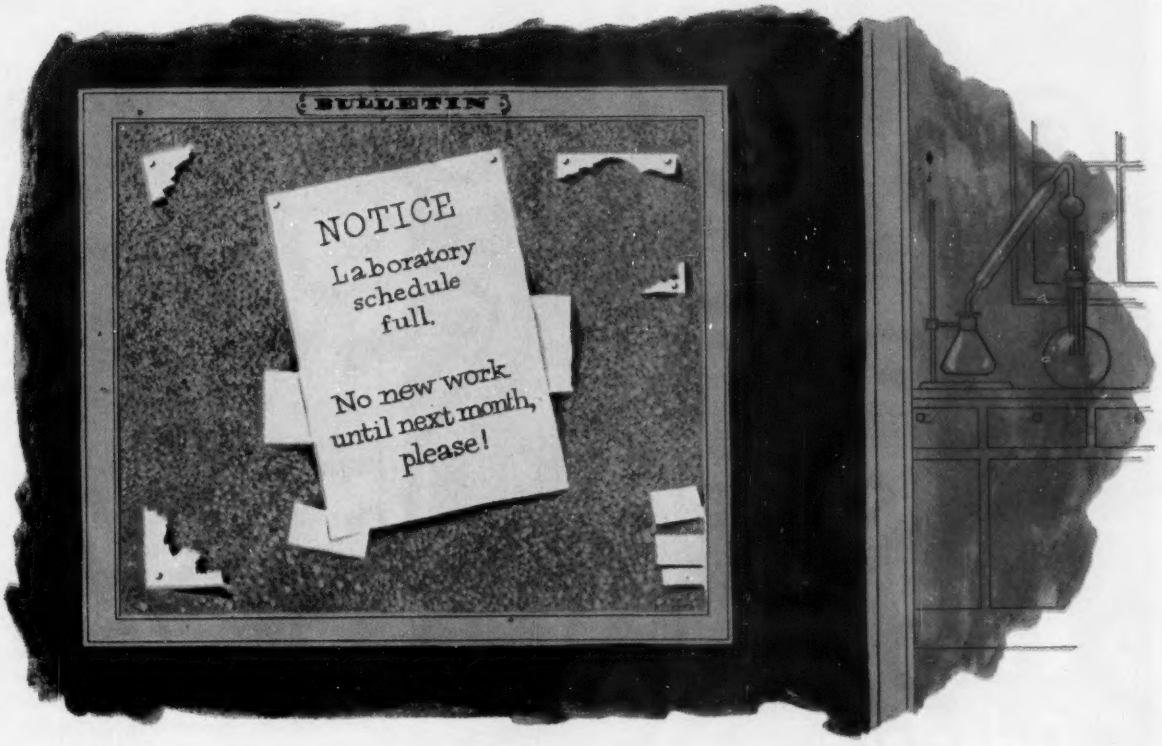

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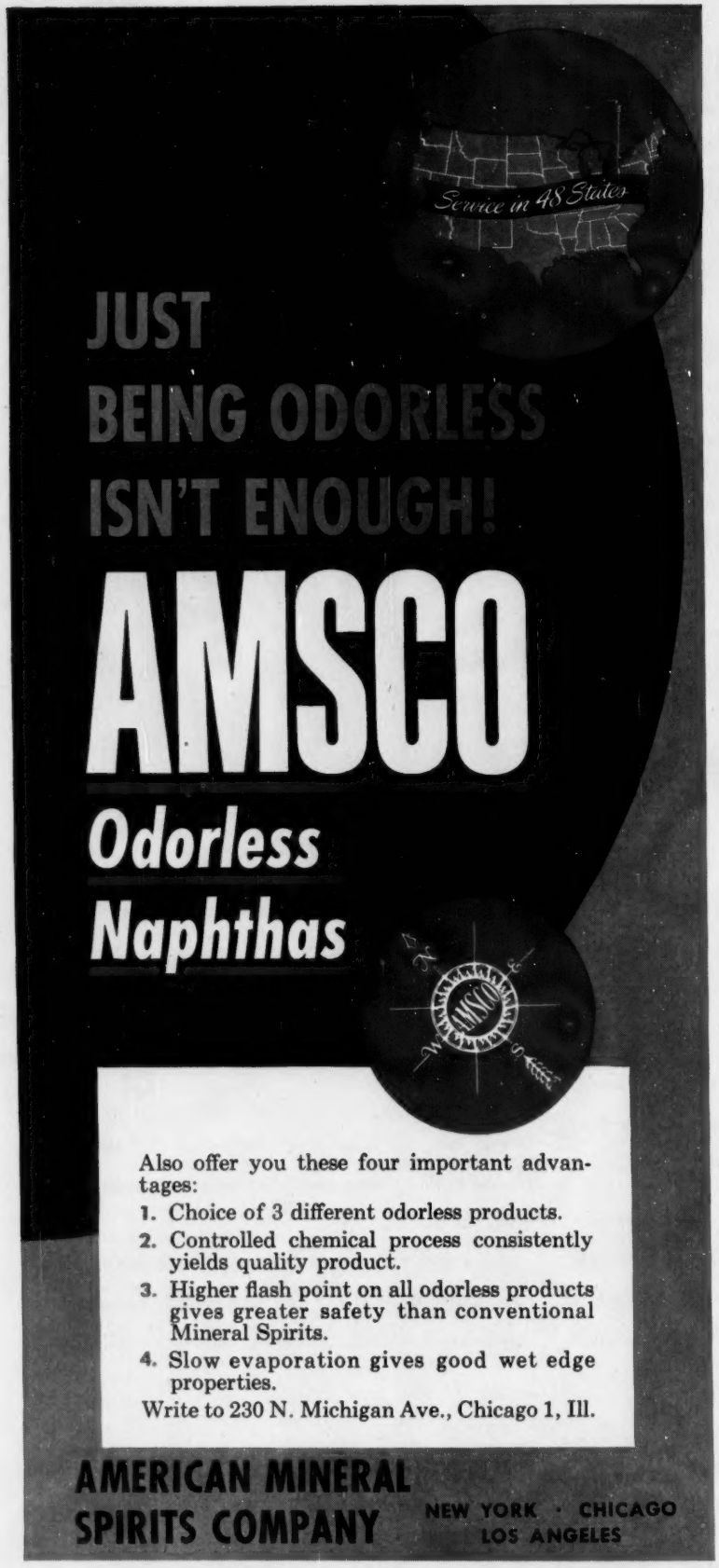
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HENRY T. ROCKWELL
President
Jones & Brakeley Inc.
New York

CW reported (Sept. 10, '55, p. 104) on Dr. Schwartz' booklet when it was first issued late last summer.—ED.

Triple Interest

TO THE EDITOR: Thank you very much for your treatment of my glass fiber survey (*July 21, p. 112*). We have received several inquiries. . . .

By the way, I noticed two articles in the same issue that had special appeal to me; one, on seaweed colloids, because during the past month we have received a number of inquiries on Puerto Rico's seaweed potential, and our industrial laboratory in San Juan is doing some research on the subject. The other article of special interest was on Panama's free zone, because we have for some time been working to establish a free trade zone in San Juan where manufacturing, assembly, financial operations could be set up.

ERIC CUMPIANO
Industrial Economist
Economic Development Administration
New York

Local Preference

TO THE EDITOR: I would like to call to your attention two news [articles] in CHEMICAL WEEK concerning Kaiser Aluminum's Ravenswood Works, and possibly correct a false impression. You refer (*July 7*) to Kaiser Aluminum hiring employees for the Ravenswood Works only from within a 50-mile area. As a matter of fact, we would be delighted, where possible, to obtain a work force of some 4,000 from within those limits. Our hope is that we can obtain a maximum number of persons from that area, and will of course give preference as a matter of policy to people in the local area. However, because of a relatively

sparse population and competition with other industries, we will definitely employ persons from outside the 50-mile limit.

Reference was made (*Aug. 11*) to "14 new apartment buildings Kaiser Aluminum is building for its employees. Also to be built: 400 brick houses to be sold to its employees." We are not building or providing capital for these apartments or homes. Your statement concerning the elementary school is correct.

I am sure that the source of these errors is the various interpretations of our activities made by the local press. We are in a situation where six dailies and three weeklies are intensely interested in our activities, and occasionally their versions differ.

BART BENEDICT
Public Relations Representative
Kaiser Aluminum & Chemical Corp.
Ravenswood, W. Va.

SEE YOU THERE

American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh, Sept. 9-12.

International Congress of Clinical Chemistry, Hotel Barbizon Plaza, New York, Sept. 9-14.

International Union of Pure and Applied Chemistry, Congress on analytical chemistry, Lisbon, Portugal, Sept. 9-16.

International Congress on Catalysis, Bellevue-Stratford Hotel, Philadelphia, Sept. 10-14.

American Assn. of Textile Chemists and Colorists, Perkin centennial and national convention, Waldorf-Astoria, New York, Sept. 10-16.

Packaging Machinery & Materials Exposition, semiannual meeting, Public Auditorium, Cleveland, Sept. 11-14.

National Petroleum Assn. annual meeting, Traymore Hotel, Atlantic City, Sept. 12-14.

Federal Wholesale Drug Assn., meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 16-19.

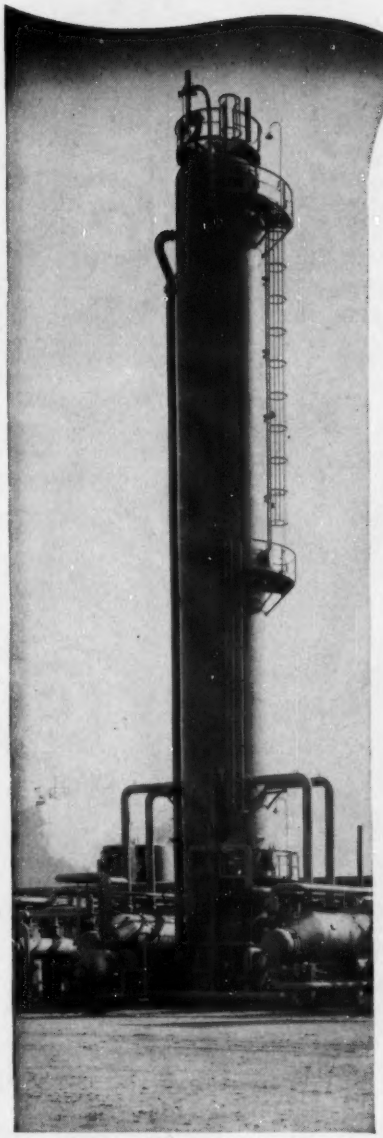
Instrument Society of America, 11th national meeting, Coliseum, New York City, Sept. 17-21.

American Rocket Society, fall meeting, sessions on propellents, combustion, telemetering, Hotel Statler, Buffalo, Sept. 24-26.

Materials Handling Institute, fall meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 24-26.

American Oil Chemists' Society, 30th fall meeting, Chicago, Sept. 24-26.

CB&I built Reactivator



strips CO_2 from Monoethanalamine

Carbon dioxide rich MEA is introduced into this 87-ft. 6-in. high reactivator tower to strip the CO_2 from the amine solution. The process regenerates the Monoethanalamine making it available for recycling. The tower was built by CB&I for the Grand River Chemical Div. of Deere and Company at Pryor, Oklahoma.

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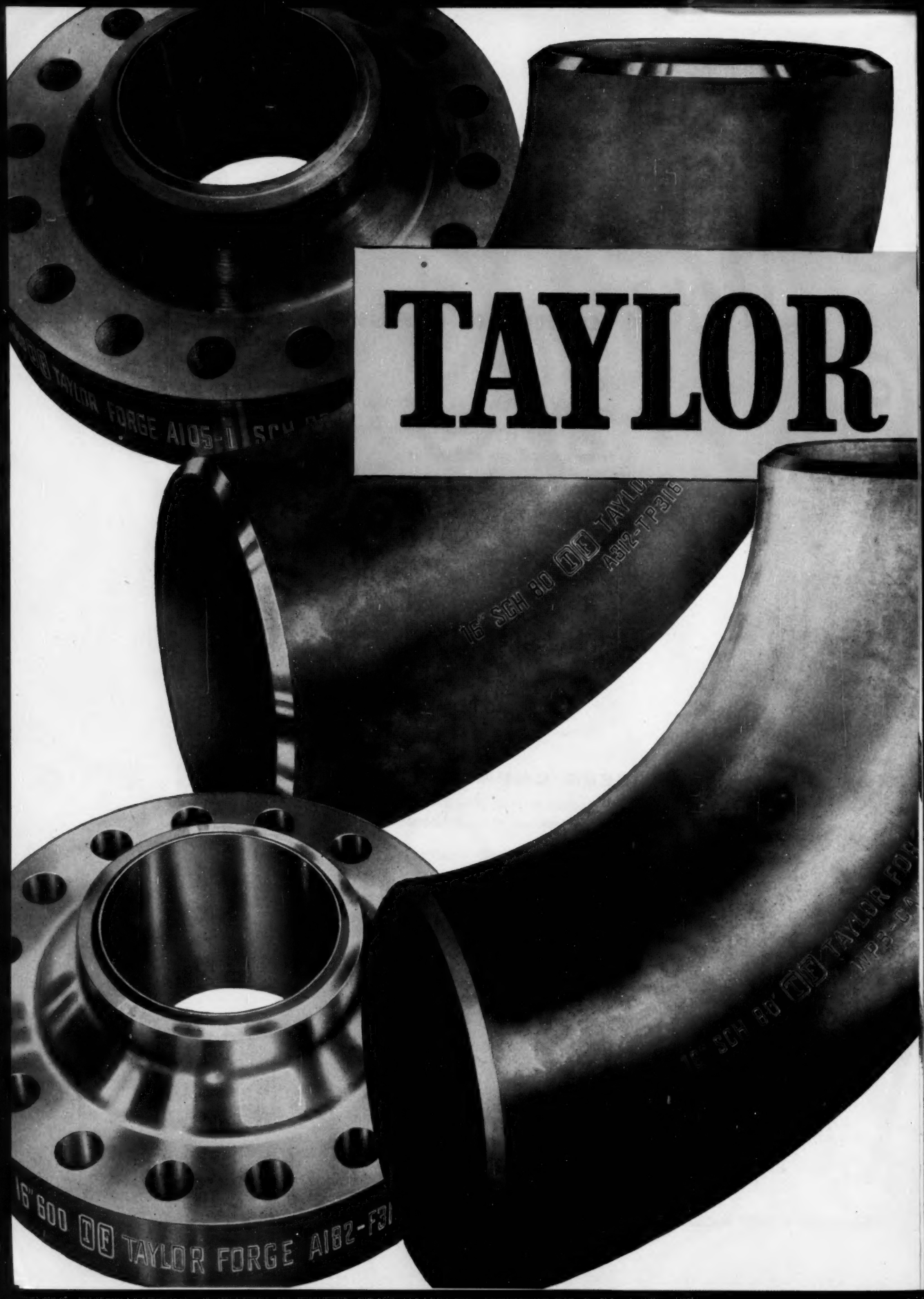
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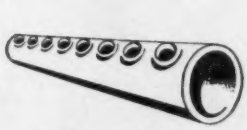

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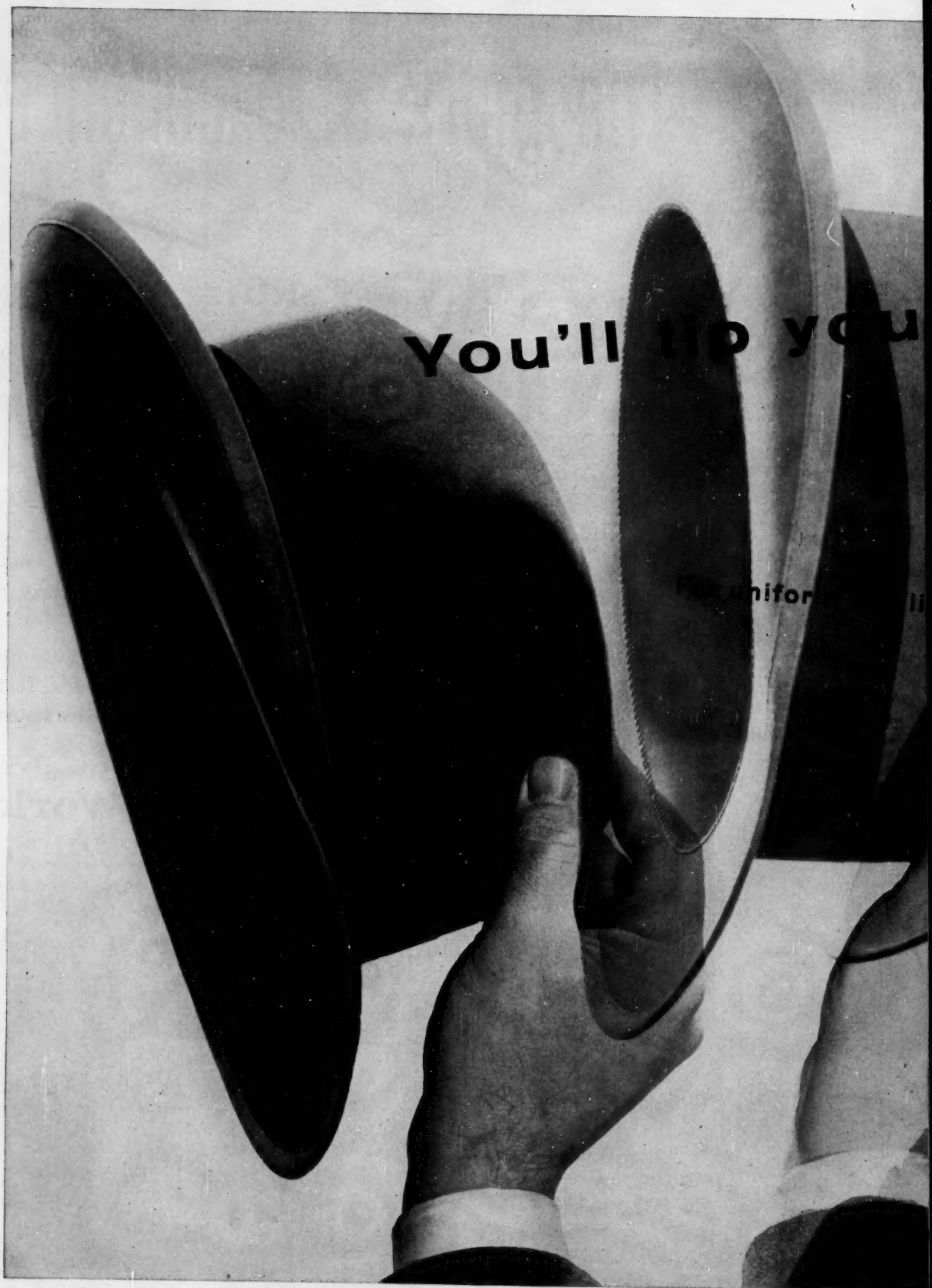
Production forgings

Venturi reducers

Spiral weld pipe

Large diameter electric weld pipe

Welding necks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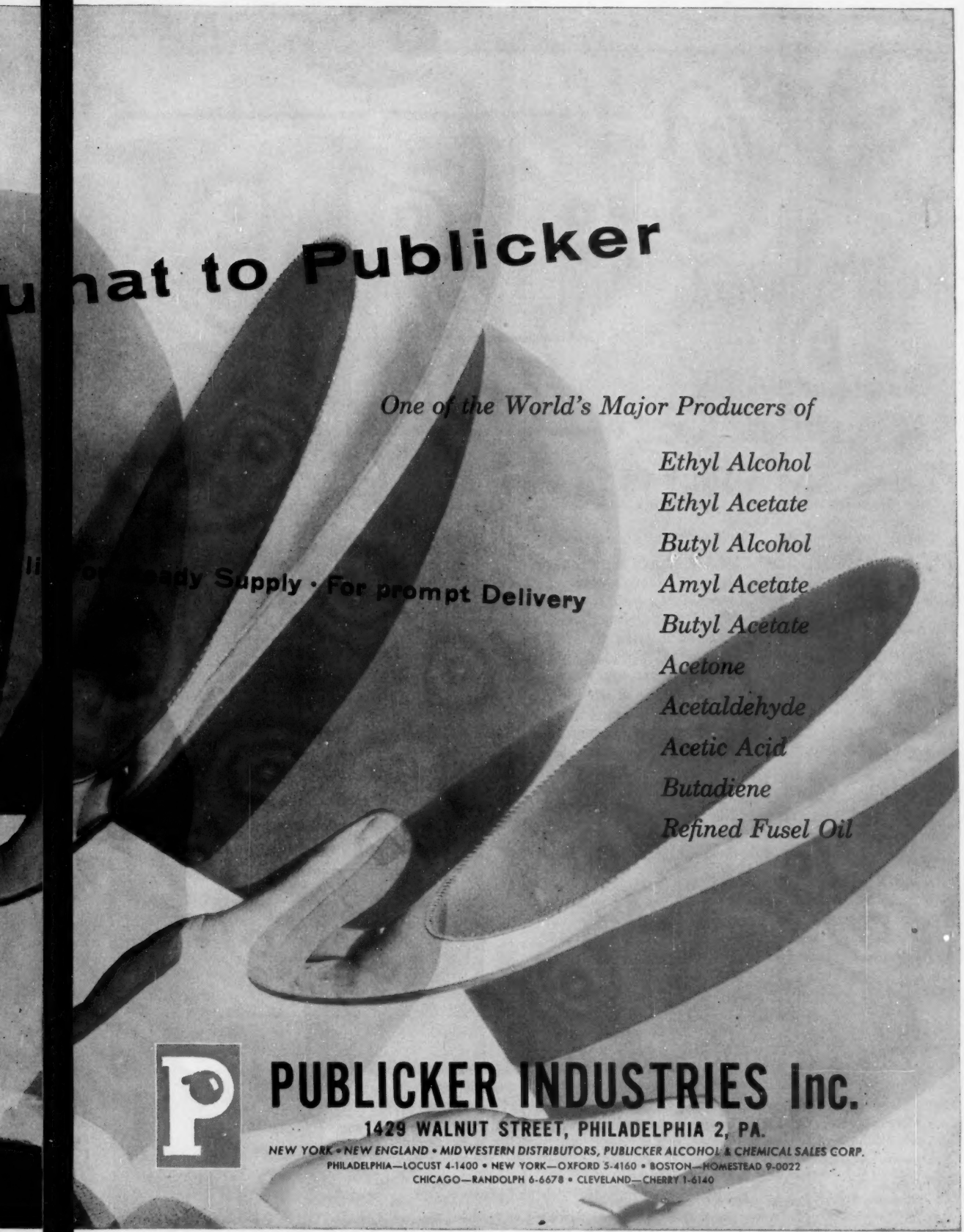
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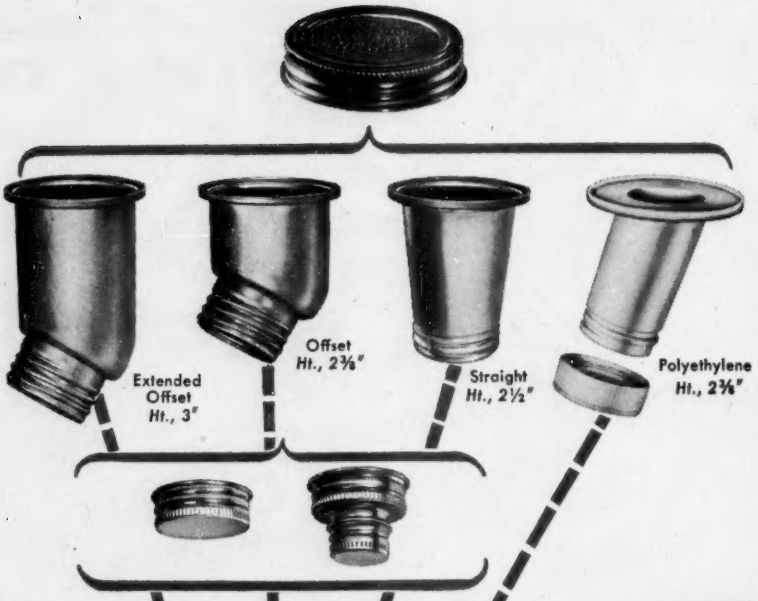

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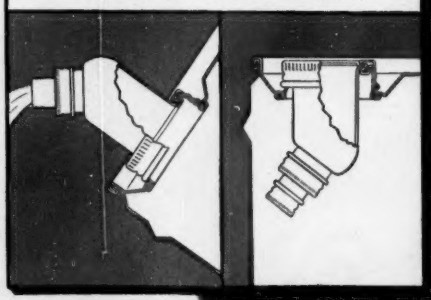

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REVERE'S KENNEDY: 'We've wanted this.'

New Team Joins the Aluminum Parade

Olin Mathieson has discarded its plans for a solo venture into aluminum (CW, July 14, p. 25), instead has taken on Revere Copper & Brass as a partner. Last week, they became equal owners of a $231-million primary aluminum production company: Olin Revere Metals Corp.

Olin Revere will build a 180,000-tons/year aluminum reduction plant and a 64,000 tons/year rolling mill at Clarington, O., a 450,000-kw. power plant at nearby Cresap, W. Va., and a 350,000-tons/year alumina ore-processing plant at a site on the Gulf Coast yet to be selected.

Olin Mathieson President Thomas Nichols points out that the new company will boost supplies of primary aluminum for OM's fabricating facilities and at significantly lower costs. James Kennedy, chairman and chief executive officer of Revere, says the new plant will supply his company with a large portion of its raw material needs. The company has wanted its own source of primary aluminum for some time.

Olin Mathieson's original plans, announced in Jan. '56, called for a 60,000-tons/year aluminum plant, 225,000-kw. power facilities and only 230,000 tons/year of alumina capacity. Planned rolling mill production was the same as for the new plant.

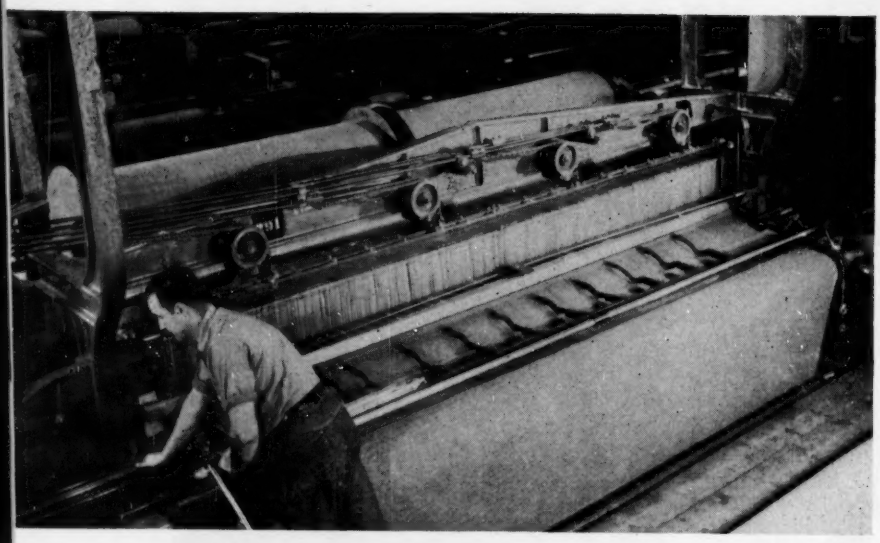
Financing Complete: Olin Mathieson and Revere are putting in equal amounts of money. Under the financing setup Olin Revere is backed by $100 million in bank loans, $100 million in first-mortgage bonds to a number of insurance companies; the remaining $31 million is being split equally between the parents through purchase of the common stock and subordinated debentures of Olin Revere.

In making the move, OM has reduced considerably the amount of cash it would have needed under its original plans. Before, OM was scheduled to put $30 million into the plant; now it needs only $15.5 million, matching that supplied by Revere. Revere itself has no debt nor preferred stock outstanding, has credit backing from American Smelting & Refining, which owns about one-third of Revere's common shares.

Power for the Ohio combination will be supplied partly by two 225,000-kw. generating units in a new power subsidiary wholly owned by Olin Revere at Cresap. A third 225,000-kw. unit at the power plant will be owned by Ohio Power Co., a subsidiary of American Gas and Electric Co., which will operate all three units. Coal for the electric station will come from mines on the Cresap site operated by Pittsburgh Consolidation Coal Co.

Who Gets What: Terms of the deal call for Olin Mathieson to get 120,000 tons/year of the aluminum, while Revere will get 60,000. Revere will put its share through its fabricating plants at Chicago and Baltimore. Olin Mathieson will fabricate 60,000 tons at Clarington, the rest at plants in the Midwest and West.

Olin Revere will get its bauxite from Dutch Guiana. It will go to the Gulf Coast ore-processing plant, then by barge up the Mississippi and Ohio Rivers to the Clarington site, where it will be processed into aluminum. Certificates of necessity obtained for the original 60,000-ton venture have been transferred to Olin Revere by the Office of Defense Mobilization.



RUSSELL AIKINS

INDUSTRY SHUTDOWN: Synthetic textile makers ease inventories, as . . .

Fiber Makers Eye Surplus

Synthetic fiber producers don't expect to be seriously affected by this week's almost-industry-wide shutdown of synthetic weaving and processing mills. Actually, the fiber makers are somewhat relieved that fabric manufacturers are taking this step to smooth out their joint inventory problems, though they do express concern over the health of the textile industry as a whole.

The week's shutdown by at least seven of the major synthetic weaving firms and as many more dyeing, finishing and converting houses is intended to allow textile manufacturers and fabric outlets to lower inventories. It's hoped, too, that the cutbacks will help solidify prices in the shaky rayon and acetate markets.

Chemical companies in the synthetic fiber field see no likelihood of cutbacks in production of such fibers as Orlon, Dacron, dynel, or Acrilan. They claim production of these fibers is already sold for the next few months. Moreover, the newer fibers constitute less than 10% of total man-made-fiber production, and producers are having few troubles finding markets.

Prime sufferers from the overproduction are rayon, acetate and nylon. The first two have had difficulties for some time. A cold spring depressed the clothing market, and curtailments by the auto makers have hurt producers of rayon tire cord. Some of these are already on short hours, won't be hit any harder this week.

Though chemical companies aren't seriously worried about the immediate effects of the week's cutback, some express the concern that it may be a manifestation of something bigger: they're still thinking about the textile depression of 1954. They see hope in one thing, however: that the highly competitive textile manufacturing business has voluntarily and independently, for the first time, made a cooperative move intended for the good of the entire industry.

Opinions differ widely on the cause of troubles in the rayon, acetate and nylon markets. Some claim the problem is cyclical, occurring biennially. Textile industry people are prone to blame synthetic fiber makers for failure to develop a diversity of new end-uses for the products, conduct exhaustive research in such fields as fabric finishes. Others, including some synthetic fiber producers, feel the problem is not a long-term one but merely reflects a subtle and continuing shift in rayon and nylon outlets, as consumers spend proportionately less of their income on clothing and as new fibers become more competitive.

Butadiene Moves West

The Canadian chemical industry's fast-moving trek to the West is pointed up this week by news that a $15-million butadiene plant will be built by the Crown-owned Polymer Corp., probably near Red Deer, Alta. Though final plans haven't yet been unveiled, the company reportedly has purchased 1,500 acres near the new $4-million gas processing plant being built by British American Oil Co. in the Nevis field.

Polymer Corp. has for some time been considering plans to build a butadiene plant somewhere in western Canada. Next door to British American's wet-gas recovery plant, Polymer will have access to some 40,000 gal./day of butane that its neighbor will produce.

Polymer officials have considered a number of likely plant locations in the West, including Fort St. John, B.C., close to the start-off of the 650-mile West Coast Transmission gas pipeline. Other possibilities: the big Pincher Creek gas field in southern Alberta and one or two Saskatchewan locations. The Red Deer location is particularly attractive; in addition to the gas supplies and butane plant, it has plentiful water sources, good rail and road transportation facilities.

Polymer Corp. has been expanding its synthetic rubber output steadily at its big Sarnia, Ont., works during the last several years, has now outrun its raw material supplies for butadiene. During 1955, some 25% of its requirements had to be brought in from the U. S.

Polymer officials have decided to go along with the Western plant with an eye towards long-term growth. Much of the company's present raw material needs could be supplied by the $25-million Imperial Oil petrochemical refinery that will be completed soon at Sarnia.

Though butadiene transportation from the West — in specially constructed tank cars—will be costly, officials expect the low-cost of raw materials and over-all advantages from integrated company operations to largely counteract this.

Polymer's decision reflects the new growth heading for Canada's West. Vast new petroleum deposits are a powerful attraction for the booming petrochemical industry.

New Look at FDA

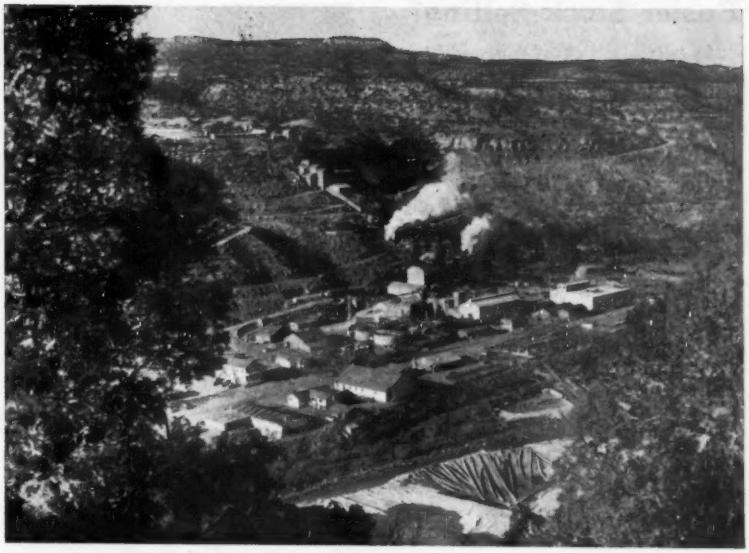
After a long look at recommendations made by the 1955 Citizens' Advisory Committee, the Food & Drug Administration has revamped its organizational hierarchy. The agency has brought together in compact form its previously loosely linked and virtually autonomous covey of operational divisions.

Object of the reorganization: to up efficiency, gear FDA for the three- or four-fold expansion in personnel and facilities that the Citizens' Committee urged be carried out over the next 5 to 10 years.

To drug, cosmetic and chemical company officials who have to deal with the agency, the changes will be hardly noticeable, since there's been no shuffling of assignments or personnel at the divisional level where most industry contact takes place. Such agency officials are still accessible to businessmen, and their authority remains unimpaired.

But the overhaul of FDA's structure will free Commissioner George Larrick and his office staff of a good deal of administrative routine. Where formerly chiefs of the agency's 11 operational divisions reported directly to Larrick or to Deputy Commissioner John Harvey on day-to-day problems, they'll now report to one of four bureau chiefs. These four will handle policy questions and administrative details of the divisional units and their branches, consulting Larrick when necessary. Under the new setup, FDA's two former associate commissioners and two divisional directors will head these new bureaus:

- The Bureau of Biological and Physical Sciences consolidates the formerly separate divisions of antibiotics, pharmacology, food, cosmetics, microbiology, nutrition and pharmaceutical chemistry.
- The Bureau of Enforcement now includes the former division of regulatory management, and handles label review, replies to manufacturers' queries and consultation with industry on labeling questions.
- The other two bureaus are changed in name only. The former Division of Field Operations becomes the Bureau of Field Administration, and the old Division of Medicine has been renamed the Bureau of Medicine.



URANIUM COMPLEXES such as this one at Uran, Colo., are springing up.

AEC Lures New Mills

What started out as a trickle of new plants to produce uranium for the Atomic Energy Commission has developed into a real rush on the part of private industry to get into the uranium business. In just five weeks, AEC has signed up six producers, and the revision of its uranium buying policy, announced last week, may encourage still more companies to get in on the program.

Topping the impressive list of newcomers is Dawn Mining Co.'s new $3-million mill to be built in Ford, Wash.; negotiations were completed last week. Other new additions—all in recent weeks—include mills contracted for by Texas Zinc Materials, at Mexican Hat, Utah; Lost Creek Oil & Uranium Co., at Split Rock, Wyo.; Union Carbide Nuclear, at Rifle, Colo.; Dawn Mining Co., at Spokane; Continental Uranium Inc., at La Salle, Utah; and Atomic Fuel Extraction Corp., at Bedrock, Colo.

Two other mills, not yet finalized, but considered imminent, are Lucky Mc-Utah Construction's proposed installation in Fremont County, Wyoming, and Vitro Corp.'s $1.2-million expansion into a new solvent process at Salt Lake City.

Behind the flurry of newly announced mills is AEC's announcement last May that it would continue to buy uranium until 1967, thus extending by five years its earlier deadline. Before the announcement, private producers didn't see how they could safely amortize a new mill before the 1962 cutoff period. Now, that problem is eliminated, and the full force of AEC's May announcement is being felt.

And it's unlikely that there will be any immediate letup in new contract negotiations; last week, AEC came up with another favorable modification of uranium buying regulations that may well provide new incentives for producers thinking of adding their names to AEC's roster. The revision scratches an old clause requiring ore companies to submit proof that development allowances were spent for that purpose during, or within six months after, the contract period. The development allowance is 50¢/lb. of contained uranium oxide delivered under the contract, and is paid to ore producers for developing or exploring their property.

Reason for the change, AEC officials said, is to permit maximum use of development allowances and to provide added incentive for exploring and mining deposits.

Result of these new policies will be a big boost in U. S. uranium output. And barring a major step-up in military needs, much of this new production is likely to go into civilian projects.

Easier Stock Selling?

As part of its effort to simplify and speed up compliance with securities laws, the Securities & Exchange Commission has just come up with two new proposals—one designed to lift some of the legal restraint now placed on SEC-registered public stock offerings, the other to more clearly define complicated securities statutes.

The suggested amendments:

- Adopt a new and simplified "summary prospectus" to be used in offering stock for sale to the public.
- Adopt a statement of policy setting out the types of situations in which SEC will refuse to shorten the statutory 20-day waiting period after a stock offering is registered and before it may legally be sold.

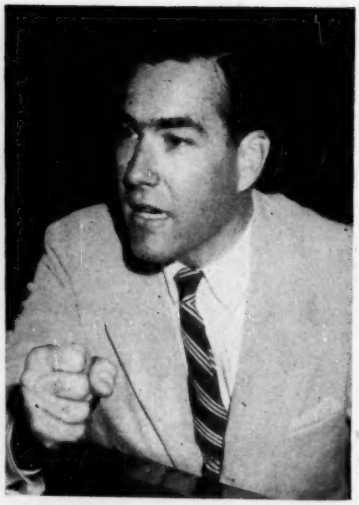
The "summary prospectus" proposal is a major departure from the normal distributing process followed in the past, since it would contain less than the detailed, factual disclosures required in the full prospectus filed with the commission itself.

For this reason, the commission is being cautious. For now, it is proposing use of the summary prospectus only by companies that file annual or other periodic reports with SEC. And, in announcing the proposal, Chairman J. Sinclair Armstrong warned that, if adopted, the commission will keep a "close watch" on how the summary prospectus works and be guided by experience in deciding whether to broaden its use.

In effect, the commission is proposing a liberalization of the rules governing what companies can say in making written offers of their stock to the public. At present, they have only two choices: using either the so-called "tombstone" ads—which list only amount of the issue, company name, offering price and names of the investment companies involved—or the expensive and bulky prospectus that is filed with SEC.

The summary prospectus would carry, in condensed form, information on the nature of the issuing company's business, the offering price and underwriting terms, intended use of the proceeds, a summary of earnings and outstanding options.

More Investors: Too, it would be short enough for economical large-scale distribution and interesting enough to at least whet investors' appetites. SEC hopes this new type of prospectus will both broaden public dissemination of registration disclosures and make it easier and cheaper for underwriters and brokers to reach potential customers.



SEC'S ARMSTRONG: On liberalized rules, keep a close watch.

The proposed statement of acceleration policy lists several grounds for refusing to shorten the waiting period between registration and sale of stock, most of which are familiar. But SEC's proposal spells out publicly for the first time two additional grounds for denying acceleration.

One is where the issuing company, a controlling stockholder or an underwriter is currently under investigation by SEC for possible securities violations. The other states that acceleration may be refused if an underwriter does not comply with the commission's net capital rules, which require at least $1 of capital for every $20 of aggregate indebtedness.

SEC has invited comments on both new proposals, will consider all views received by Oct. 31, before taking further formal action.

Ready Salk Exports

Salk vaccine producers are this week studying the new government export license application rules and criteria. Manufacturers have been holding off submitting applications pending such announcement by the Dept. of Commerce's Bureau of Foreign Commerce.

Export supplies of the vaccine will come from the same lots approved by the U. S. Public Health Service for domestic distribution. This system has been okayed by countries that have applied for U. S. vaccine under the licensing program announced two weeks ago.

The export licensing system is operated by the Foreign Commerce Bureau, which sets export quotas after getting recommendations on size from a committee of three agencies—BFC itself, the State Dept., and USPHS. It's expected that the quotas will be heavily oversubscribed.

There's a ready market abroad for the vaccine. Other nations are having a tough time making the vaccine. Besides the U.S., only England, Canada, Denmark and South Africa are in production, and the latter three can't make enough even to meet domestic needs.

U. S. producers, on the other hand, hit a production peak during June, largely by shifting personnel from other jobs. Production slid somewhat in July, however, because drug firms couldn't afford to keep their technicians on such a program for very long.

Another problem faced by producers is that demand at home will eventually taper off (Smallpox is virtually eliminated in the U. S., yet smallpox vaccine gives immunity for only 3-5 years and is but 40% effective.) The implication is that when polio is well curbed here, there'll be plenty of vaccine production available for export, even at present production levels. Moreover, reports indicate that some other countries have much graver polio problems than the U. S. has ever had.

EXPANSION

Copper/Nickel: Eastern Mining and Smelting Corp. will build a $30-million nickel and copper processing plant at Chicoutimi, Que. Capacity: nickel, 300 tons/day; copper, 600 tons/day.

•

Vegetable Oils: Spencer Kellogg and Sons, Inc., will build a $5-million soybean and flaxseed processing plant near Breckenridge, Minn. The company produces a number of special-process oils for industrial uses. Construction will start in the spring of '57.

•

Potash: Port Wentworth Corp. (Savannah, Ga.) will make a $150,000 preliminary mining survey on

Washington Angles »

» **U.S. Public Health Service** will soon add two new strings to its air pollution control bow. It will put $100,000 into a training program to include sponsorship of air pollution courses for college students, state and local agency employees. And, $150,000 of the service's funds will be spent this year on special demonstration programs to help states and cities find the answers to particularly knotty air pollution problems.

» **Chemical, oil and rubber firms rank higher** than ever in the Pentagon's latest listing of the top 100 military contractors. For calendar year '55, Esso Standard Oil (New Jersey) rated 16th, with $155.1 million worth of orders; Goodyear Tire, 23rd, $106.5 million; Olin Mathieson, 42nd, $46.6 million.

On the basis of total orders since 1950, Goodyear ranks 27th, $646 million; Olin Mathieson, 30th, $556.8 million; Esso Standard, 35th, $506.1 million.

» **The value of export licenses** for shipment of chemicals—excluding drugs—to the Soviet Union and its European satellites was three times greater in the second quarter of 1956 than in the first quarter, the Commerce Dept. reported last week.

The second quarter total was $175,300, compared with $58,900 for first three months of '56.

Licenses for export of N-type synthetic rubber, with a total value of $122,700, accounted for most of the increase and reflected a new Soviet interest in importing this item.

The value of licenses issued for drugs, medicinals, laboratory and medical equipment also rose in the second quarter, to $112,000 from $73,800 in the preceding three-month period.

---

nearly 2,000 acres of potash land it recently leased near Port Wentworth, Ga.

•

Zirconium: Kennecott Copper Co. has retained Horizons, Inc., to build a zirconium sponge pilot plant in Bedford, O.

•

Pulp and Paper: Elk Falls Co., a Crown Zellerbach Canada Ltd. subsidiary, plans a $7.5-million expansion of its newly completed $15-million kraft pulp mill on Vancouver Island. Present capacity is 400 tons/day, will be hiked in 1957 to 500 tons.

• Hammermill Paper is considering doubling its recently announced multimillion-dollar expansion program. The company has spent $25 million in the past 10 years to increase capacity from 76,000 gross tons/year to 133,000.

•

Zirconium: Wah Chang Corp. will build a zirconium chlorination and reduction plant at Albany, Ore. At the same time, the firm will enlarge zirconium oxide production and zirconium-hafnium separation facilities it now operates in a plant leased last spring from the government.

•

Benzene/Toluene/Xylene: Canadian Oil Refineries, Ltd., has awarded a contract to Fluor Corp. of Canada, Ltd., for the design and construction of a $3-million, 4,400-bbls./day Platformer and 3,600-bbls./day Udex unit at its Sarnia, Ont., plant. The new units will produce high-octane motor fuel, benzene, toluene and xylene. Completion is scheduled for summer, 1957.

•

Aluminum: Aluminum Co. of America will add a seventh potline to its primary aluminum plant at Point Comfort, Tex., increasing capacity 17% to 140,000 tons/year. Cost: $11 million.

COMPANIES

Koppers Co. and Kennecott Copper Co. will submit a joint proposal to the Atomic Energy Commission for a contract to prepare 5,000 tons/year of uranium salts. The multimillion-dollar venture would be equally supported by each.

•

Metal Hydrides, Inc., will offer (Sept. 12-25) 85,266 shares of $5-par common stock to shareholders on a one-for-three basis. Proceeds will be used to finance a $1-million sodium borohydride plant the company will build to supply U.S. Navy needs.

•

General Mills, Inc., has acquired assets of Brooklyn Products Co. (Brooklyn, Mich.), which manufactures a line of impregnated cellulose and plastic sponges. Terms of the deal were not announced.

•

Escambia Chemical Corp. will be the new name of Escambia Bay Chemical Corp.; company offices will be headquartered in New York.

•

Amoco Chemicals Corp. will be the name of the recently consolidated chemical subsidiaries of Standard Oil of Indiana.

•

Dunlop Canada Ltd., wholly owned subsidiary of Dunlop Rubber Co., Ltd. (England), will offer common share participation to Canadians within the next two years.

•

Detrex Chemical Industries, Inc., has completed transfer of all outstanding capital stock from Hooker-Detrex Inc., and has completed the merger of Hooker-Detrex Inc., the Detrex Corp., and the Detrex Realty Co. into Detrex Chemical Industries, Inc.

FOREIGN

Electrochemicals/Britain: Harshaw Chemical Co. (Cleveland) has established Harshaw Chemicals Ltd., a wholly owned subsidiary in London. It will produce electroplating chemicals, other products as British markets develop.

•

Cellulose/Rumania: East Germany, Czechoslovakia and Poland have signed a pact with Rumania pledging to help build a new 200,000-tons/year

ANOTHER JOB

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This is the new look in metal casting. Shell molds like these have brought a new era of economical mass-production into foundry operations. Formed by blowing or dumping a sand-and-resin mix onto hot patterns, the thin shells save time, labor, floor space, and metal, and produce smooth precision castings that reduce machining costs.

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cellulose plant near Braila, southern Rumania. Production is scheduled to get under way in Jan. '61.

•

Pulp/France: La Cellulose d'Aquitaine will build a 30,000-tons/year pulp mill near Muret in the Garonne Valley. Cost: $11 million. It's scheduled for completion in '58.

Slowdown in Venezuela

Venezuela's new $150-million petrochemical complex, under construction since last December, is now expected to fall many months behind schedule. Reason: the Venezuelan government has just terminated its contract with Blaw-Knox Engineering Co. (Pittsburgh).

The Venezuelan Petrochemical Institute, newly created government agency, will take direct charge of all design and construction of the project, taking over Blaw-Knox's duties as well as those of several German and Italian companies that were engineering coal and mineral projects.

The move was officially described by the government as part of a long-standing plan for one of its agencies to eventually operate the plants. Blaw-Knox explains, in an official statement, that Venezuelan engineers, sent abroad for training, will actually be available for assignment in Venezuela this month—much sooner than the company anticipated when it signed its contract last December.

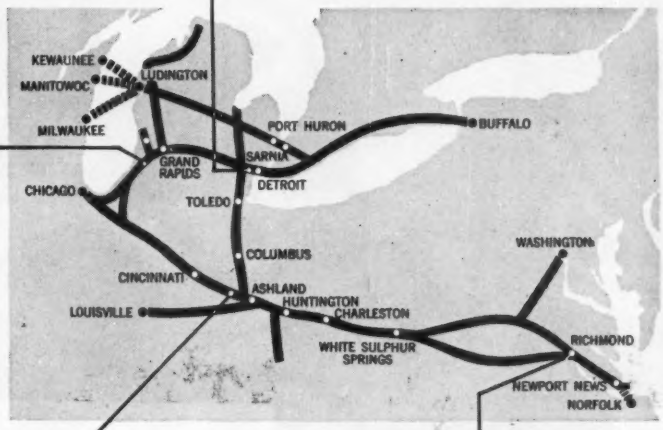
Blaw-Knox discounts reports that the step was taken because the government was dissatisfied with progress at Morón, where plants are being built, says government agencies actually praised Blaw-Knox's work: "Dr. Alberto J. Caldera, head of the Petrochemical Institute, said our contributions had been very valuable, especially in the planning of the job and the training of personnel."

But there's little doubt that the agreement was called off at an unfortunate point in the building program —unfortunate for both Blaw-Knox and the Venezuelan government. Besides leaving the American firm in an embarrassing position, the hasty transition came at a time when two of the principal structures were only partly erected and blueprints for others still incomplete. Engineers who could interpret existing data and drawings have been transferred back to the U. S.

Some good spots for your new plant site

LIVONIA, MICH.

A growth location. Between Detroit and Plymouth in the heart of the Motor Belt. Trackside properties up to 100 acres with all utilities at hand. The area also offers excellent highways. And few others can boast of as large a pool of skilled labor.



MUSKEGON, MICH.

Michigan's Largest Port on Lake Michigan. Lake water and salt deposits in unlimited supply. First class rail, water, air and highway transport. Good sites on C&O lines in the city, to the north, and to the south. Add a bonus here in attractive living and good recreation.

SOUTH PORTSMOUTH, KY.

Ohio River vantage point. South Portsmouth is just across the Ohio river from Portsmouth, Ohio, one of the few cities in the country with a real surplus of skilled labor, due to completion of the nearby AEC plant. It is the station for Portsmouth on the C&O mainline with direct service to all points for both freight and passengers. Good plant sites are available fronting on both rail and river.

RICHMOND, VA.

Gateway to the Southeast. One of the best distributing points for the Southeast is Richmond, with its network of rail lines fanning out in every direction. The 200 acre airport Industrial District is within Richmond switching limits and adjoins the Byrd Airport. Ford Motor and Allis Chalmers have plants here now.

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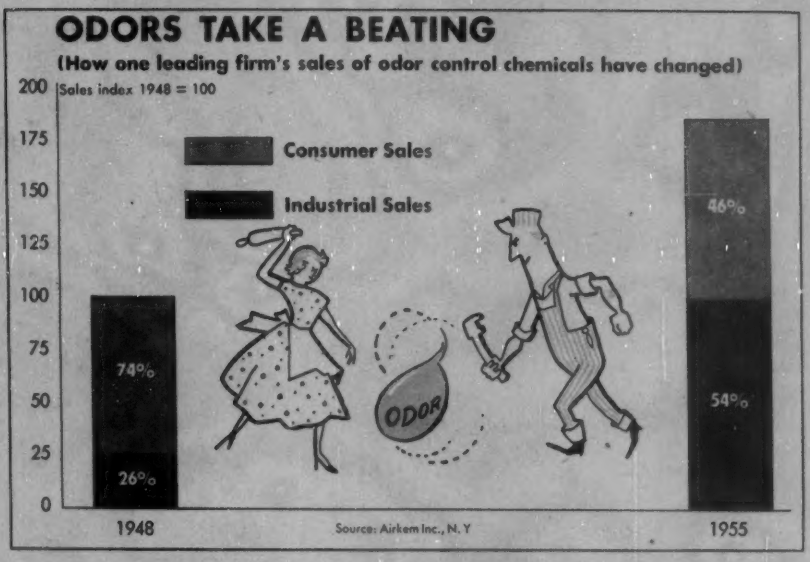
CHEMICALS

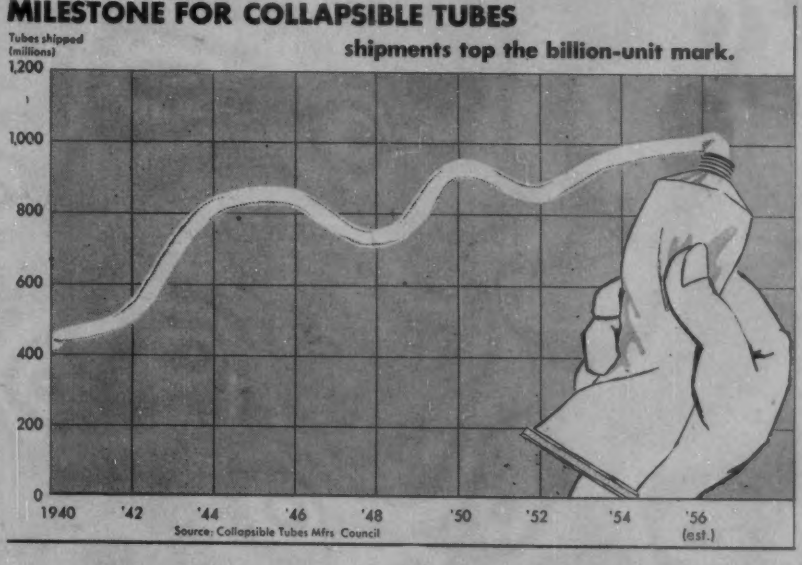
Agricultural, automotive, aviation, building, electrical, paper, pharmaceutical, plastics, surface coatings, textile.

Charting Business

CHEMICAL WEEK
September 8, 1956



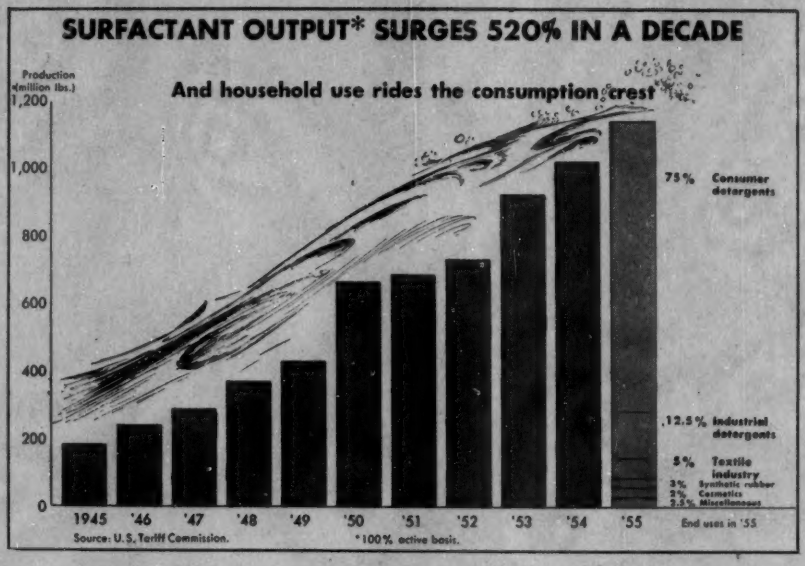
INDUSTRY, because of growing complaints and legislative action within the past five years, has become more aware of air pollution—particularly odor problems—and its control. This is reflected in the change in the sales pattern of one of the leading (Airkem Inc.) makers of odor counteractants. Last year its industrial products sales equaled '48's total sales of both consumer and industrial deodorants. Although consumer requirements are growing, industry's needs are expected to expand more rapidly as it continues to battle its pollution problems.



VERSATILITY of collapsible tubes has made them one of the leaders in the packaging field. Shipments of these containers last year exceeded those in '54 by 9%, are expected to rise to 1.1 billion units/year in '56. This reflects the increased demands of manufacturers of dentifrices, drugs, cosmetics, shaving cream, food products, etc. In '55, e.g., dentifrices and drugs, largest consumer of squeezable metal tubes, took 53% and 18.5%, respectively, of total shipments. Their demands for the first half of '56: highest ever.

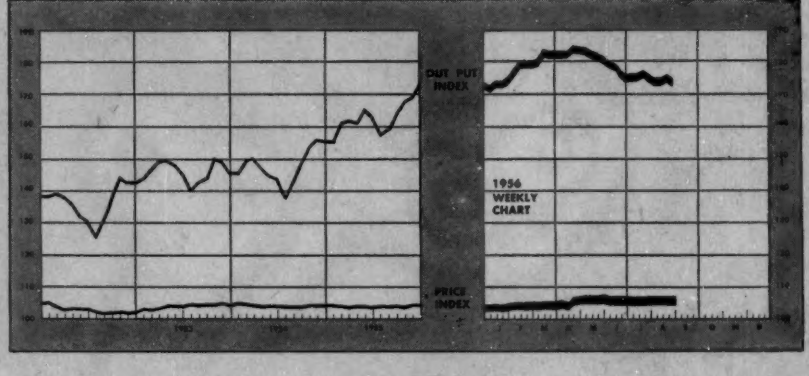
Charting Business

(Continued)



OUTPUT of surface-active agents in the last 10 years has impressively grown from 185 million lbs. to nearly 1.2 billion, with household detergents sparking the upsurge. What does surfactants total production consist of today? Here's the breakdown: anionics, 79%; nonionics, 20%; cationics, 1%. Attention is now focused on the nonionics. Reasons: wider application; outstanding stability; chemical structure can be easily modified. One discordant note: they cost more.

BUSINESS INDICATORS



WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	173.1	173.5	160.8
Chemical Week Wholesale Price Index (1947=100)	105.5	105.6	104.6
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	467.8	474.8	470.9

MONTHLY

Production (Index 1947-49=100)

	Latest Month	Preceding Month	Year Ago
All Manufacturing and Mining	129	141	130
All Chemical Products	166(e)	173	158
Industrial Chemicals	189(e)	193	181

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with low temperature solderability

FORMVAR has now been evaluated in combination with isocyanates and their derivatives. These new compositions provide wire enamels of exceptional performance in low temperature solderability. The new coatings, called Formvar urethanes, meet all the rigorous specifications of the magnet wire industry and compare favorably with the familiar Formvar phenolic in electrical properties, resistance to thermoplastic flow, and resistance to heat and water. Application procedures are the same as those used with Formvar phenolic.

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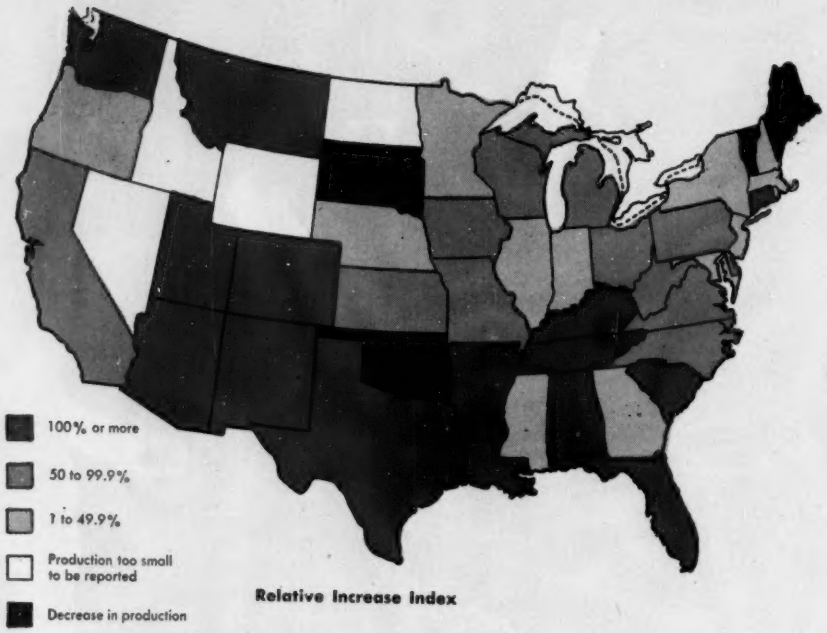


Chemicals Go South, West

In deciding where to build plants and warehouses and how to deploy your sales staff, you'll do well to study the just-out preliminary reports on the U.S. Commerce Dept.'s 1954 census of manufacturers.

Among its figures confirming the chemical industry's pronounced southward and westward movement since the end of World War II:

- Texas has moved up from ninth place in 1947 to third in '54 in production of chemicals and allied products, as measured by value added by manufacturing (*see table, p. 51*).
- South Carolina boosted its value-added total in this industry eightfold in the seven-year period.
- Of the 14 states that more than doubled their value-added totals during the seven years, only one—Connecticut—was in the Northeast. All the others were in the South, West, or Southwest (*see map*).

Dispersion Status: Whether the industry is sufficiently decentralized for economic and defense purposes is still an open question. The new census shows that 50% of the industry's value-added total comes from 20 communities (*see table, right*). While the first- and third-ranking industrial centers are only 83 airline miles apart and just 70 miles separate Nos. 13 and 20, most of these manufacturing hubs are fairly well dispersed over the whole country. Eleven of the 20 localities are more than 500 airline miles from New York City, including six that are on the Mississippi River or west of it.

This 20-community list is marred by several notable omissions, such as Charleston-Institute, W. Va.; Beaumont-Port Arthur, Tex.; Baton Rouge, La.; and Calvert City, Ky. The Census Bureau doesn't itemize industry-by-industry figures for those communities because they fall short of the 40,000 manufacturing employment level the government uses to define its "standard metropolitan areas." However, it appears that none of these other localities could rank higher than fourth in 1954 chemical production.

Productivity Up: Pointed up strikingly in the new census is a sharp rise in this industry's over-all productivity. While employment of maintenance and production workers rose only 1.7% (from 523,000 in '47 to 532,000 in '54), value added by manufacturing was up 75.1% to $9.4 billion. Indicative are such state changes as:

- West Virginia—chemical employment up 5.4% from 1947 to '54; chemical output up 82.1%
- Virginia—employment up 3.4%; output up 96.9%.

New capital spending during calendar year 1954 by makers of chemicals and allied products is reported at $928 million. Top-ranking states: Texas, $145 million; New Jersey, $88 million; Louisiana, $66 million; Illinois, $55 million; and Ohio, $52 million.

How the industry will stand when the next manufacturing census is taken may depend considerably on how rapidly all this current information is fed into chemical companies' plan-making machinery, and on how well the facts are used in long-range planning.

TOP 20 CHEMICAL COMMUNITIES*

(By output of chemicals and allied products, 1954)

Rank	Metropolitan Area	Value Added by Manufacture (in millions)
1	New York City and northeast New Jersey	$1,371
2	Chicago and vicinity	518
3	Philadelphia area	357
4	St. Louis area	241
5	Detroit area	220
6	Los Angeles area	212
7	Houston area	203
8	Cincinnati area	197
9	Buffalo-Niagara Falls	192
10	Louisville area	169
11	Cleveland area	162
12	San Francisco Bay area	154
13	Boston area	118
14	Baltimore area	116
16	Indianapolis area	105
16	Kansas City area	100
17	Minneapolis-St. Paul	80
18	Chattanooga area	73
19	Pittsburgh area	70
20	Springfield (Mass.) area	48

*Among localities having all-manufacturing employment of 40,000 or more.

CHEMICAL SWEEPSTAKES: WHO'S AHEAD?

(Preliminary state-by-state report on chemicals and allied products— 1954 census of manufactures)

RANKING BY MANPOWER, 1954

Rank	State	Employment	Payroll (in thousands)
1	New Jersey	81,661	$399,783
2	New York	67,818	304,959
3	Illinois	51,908	240,020
4	Pennsylvania	45,182	200,220
5	Tennessee	43,083	197,191
6	Ohio	41,596	195,101
7	Michigan	39,158	192,909
8	Texas	37,289	181,448
9	Virginia	34,925	146,443
10	California	32,893	152,373
11	Indiana	26,719	133,290
12	West Virginia	21,741	111,459
13	South Carolina	19,294	93,089
14	Missouri	18,271	81,300
15	Louisiana	17,535	83,893
16	Massachusetts	15,923	69,963
17	Maryland	12,632	51,631
18	North Carolina	11,496	43,721
19	Washington	11,087	61,506
20	Georgia	10,086	29,748
21	Connecticut	9,946	44,612
22	Kentucky	9,798	46,242
23	Florida	9,523	34,089
24	Kansas	9,353	41,125
25	Wisconsin	8,985	40,684
26	Alabama	7,523	28,160
27	Iowa	6,028	24,928
28	New Mexico	5,996	31,954
29	Delaware	5,938	27,181
30	Mississippi	5,739	19,244
31	Minnesota	5,317	21,950
32	Arkansas	5,293	20,910
33	Colorado	3,154	14,444
34	Nebraska	1,659	6,524
35	Oregon	1,513	6,620
36	Oklahoma	1,484	5,451
37	Utah	1,374	5,758
38	Rhode Island	1,228	5,246
39	Arizona	1,224	5,127
40	Montana	837	3,662
41	Maine	576	1,885
42	New Hampshire	366	1,460
43	Vermont	231	787
44	District of Columbia	223	1,079
45	South Dakota	138	505

RANKING BY OUTPUT

State	Value Added by Manufacture (in thousands) 1947	1954	Percentage Increase
New Jersey	$743,342	$1,090,959	47.0
New York	585,020	867,140	48.1
Texas	234,496	725,247	208.4
Illinois	438,305	656,886	49.9
Ohio	347,226	557,231	60.5
Pennsylvania	310,828	509,249	63.2
Michigan	281,669	499,768	77.3
Tennessee	162,578	455,691	180.6
Virginia	218,528	430,846	96.9
California	280,195	429,168	53.0
Indiana	246,144	338,286	37.2
West Virginia	175,898	320,419	82.1
Louisiana	113,482	251,351	121.5
Missouri	129,257	233,418	80.3
Massachusetts	144,644	187,429	29.7
Kentucky	47,953	148,659	210.0
Maryland	142,559	144,478	1.3
South Carolina	16,595	143,135	764.0
Connecticut	52,329	126,931	142.2
Washington	15,570	118,212	660.0
Kansas	66,841	108,799	62.4
North Carolina	58,607	103,854	71.9
Delaware	59,863	101,153	69.2
Minnesota	68,205	99,569	46.1
Wisconsin	49,249	97,554	98.1
Alabama	46,087	82,814	79.5
Florida	28,774	81,814	184.2
Georgia	77,043	80,995	5.0
Iowa	50,977	76,678	50.8
New Mexico	13,738	68,252	396.8
Arkansas	29,194	63,754	118.4
Mississippi	35,342	52,355	48.0
Colorado	8,271	33,089	300.0
Oregon	11,750	17,209	46.3
Arizona	5,771	15,141	162.0
Nebraska	10,926	14,877	35.9
Rhode Island	10,239	11,679	14.0
Utah	5,112	11,017	115.1
Oklahoma	12,127	10,433	−13.9
Montana	2,149	5,833	171.3
Maine	5,336	4,999	−6.3
New Hampshire	2,801	2,872	2.5
Vermont	2,777	2,726	−1.6
District of Columbia	1,216	1,884	55.0
South Dakota	1,644	909	−39.8

In Court: Odds Favor Patent Office Stand

The U.S. Patent Office is handling more applications than ever before, but its decisions are still holding up well. If you appeal an adverse ruling to the courts, odds are 3-to-1 that the Patent Office's finding will stand.

This is the conclusion from the latest check of the 25 major chemical patent cases over the past year and a half; in 18 of them, the Patent Office decisions were upheld by the courts.

A Slight Decline: The current 3-to-1 odds are somewhat lower than the 5-to-1 chance of survival Patent Office decisions enjoyed over the five-year period ending in mid-1954 (*CW, Aug. 28, '54, p. 26*).

Then as now, the overwhelming number of cases were handled by the U.S. Court of Customs and Patent Appeals. This court shares jurisdiction with U.S. District Court at Washington, D.C., and a person dissatisfied with a Patent Office ruling may bring his appeal to either place. In a dispute over who made a discovery or invention first, if the losing party in Patent Office proceedings appeals to the Court of Customs and Patent Appeals, the winning party can "elect" to take the appeal away from that court into the District Court.

Significant Cases: Among the more significant patent cases for the chemical industry during the past 18 months was the first appeal dealing with the patenting of a method and apparatus for extraction and utilization of thermal energy resulting from atomic decomposition of uranium and its compounds. In reversing the Patent Office Board of Appeals and remanding the case for further proceedings, the U.S. Court of Customs and Patent Appeals (In re Chilowsky, Jan. 20, '56) said that the same principles should apply in determining operativeness and sufficiency of disclosure in applications relating to nuclear fission as in other cases.

Numerous Trademark Cases: Trademark cases have consistently come in for a sizable share of the attention in patent appeals. It's interesting to note that of the six Patent Office decisions reversed by the courts—one other decision was "modified"—during the past 18 months, three were in trademark cases.

One concerned the attempted regis-

THESE 1955-56 PATENT DECISIONS WILL PLAY IMPORTANT ROLES IN FUTURE CHEMICAL INDUSTRY CASES

In Patentability Cases:

- **General principles of patentability also apply to nuclear fission applications.**

In Trademark Cases:

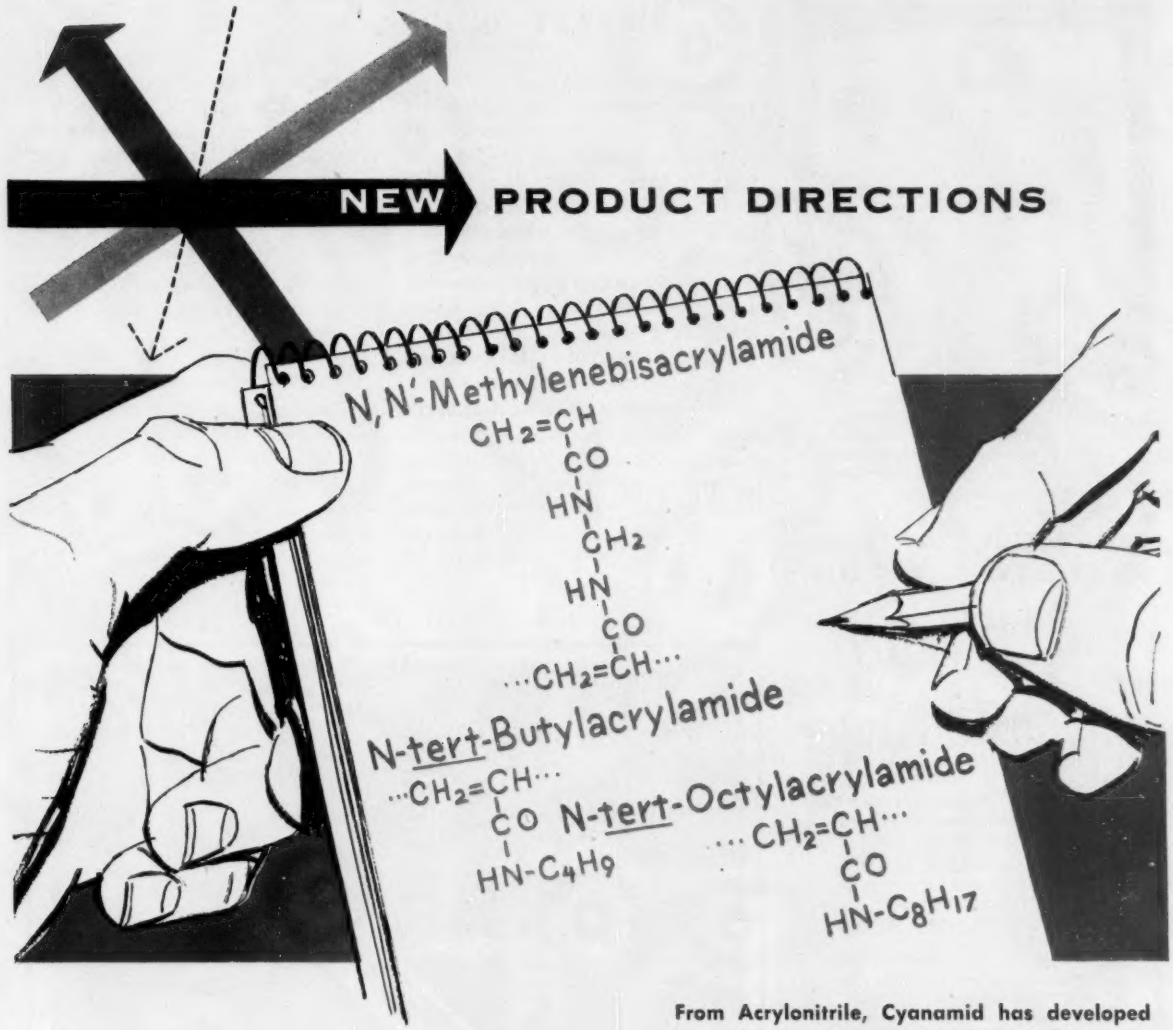
- **Distinctive packaging can be registered—if it's not just for show.**
- **Use of a suffix with one trademark doesn't preclude its use with the trademark of another firm, if trademarks are not confusing.**

In Interference Cases:

- **A product that's material to an interference decision need only be identified with reasonable certainty—not beyond reasonable doubt where applications are copending.**
- **Patents on generic inventions must rest on generic discovery.**
- **Working examples of chemical compounds are not necessary to prove constructive reduction to practice.**
- **Conception of an invention is less a matter of signature than of disclosure.**

In Patentability Claims Cases:

- **Comparative tests are needed to prove unexpected superiority over a reference patent.**
- **Temperature changes, concentration, or both may impart patentability to a process, if ranges claimed produce new and unexpected results different in kind—not merely degree.**
- **Inventors are not entitled to subsequent patents, if further claims are not patentably distinguishable.**
- **Superiority is not patentable, if process is fairly suggested by prior art.**
- **Arguments must be based on reference patent's claims, not on briefs.**
- **A reference clearly naming or identifying a compound constitutes full anticipation claims.**
- **Claims can be rejected on a combination of references, even though the combination fails to show all limitations.**



From Acrylonitrile, Cyanamid has developed several interesting compounds, including:

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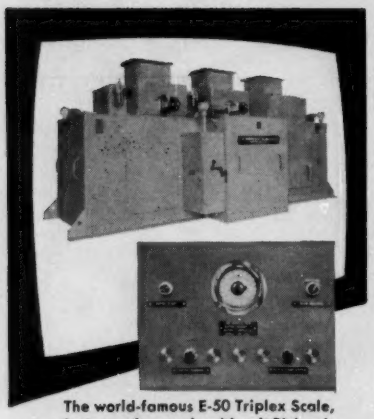
tration by Swift and Co. of a distinctive polka-dot trademark (In re Swift and Co., July 1, '55). The Patent Office's examiner-in-chief denied the registration. The Court of Customs and Patent Appeals ruled that if the polka-dot design by its distinctiveness may perform the office of a trademark, it is registerable. Design is not necessarily registerable, the court said, unless it is used primarily for identification.

Other Significant Cases: Several other decisions (*see table*) are certain to bear on future chemical industry cases, though it's practically impossible to ascertain a trend in the court's thinking in the light of existing decisions. It can be said, however, that in cases of patentability claims, the decisions appear to lean toward stricter interpretation of the law. This can be seen in decisions that: require comparative tests to prove unexpected superiority over a reference patent; prevent subsequent patents for further claims to a process or product when such claims are not patentable alone, if the process or product is fairly suggested by prior art; specify that temperature changes, concentration of acids, or both, may impart patentability to a process, if ranges claimed produce new and unexpected results different in kind—not merely degree.

Even in the absence of a specific trend, these decisions should be watched as the forerunners of future chemical patent decisions.



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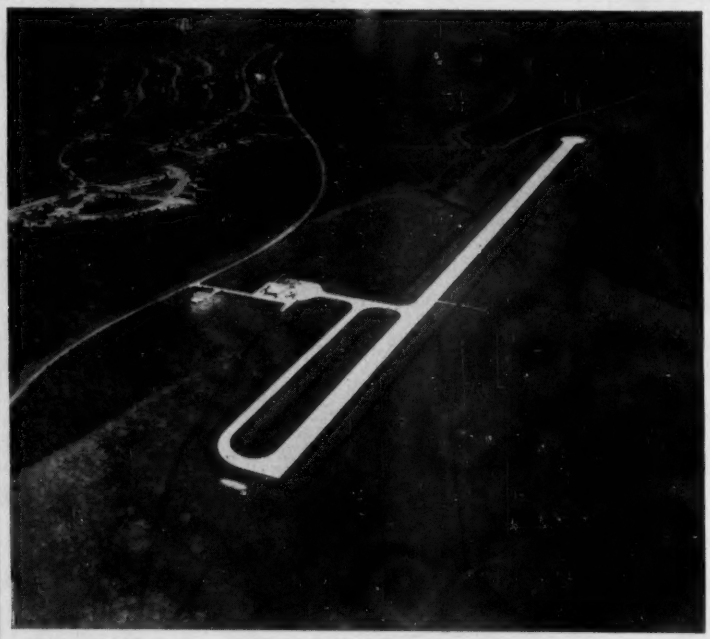
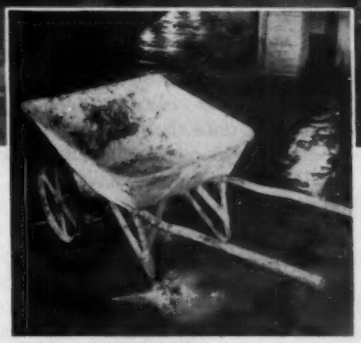


An Airport All Its Own

PROBABLY the country's only chemical works with a private airport for its company-owned airplanes is Dow Chemical's Texas Division, whose landing field (*above*) lies just west of the town of Lake Jackson, where many Dow employees live. Built by a Houston contracting firm, the airport has a 5,000-ft. paved runway, a shorter taxi strip, and a parking apron. The three aircraft assigned to the Texas Division—a Douglas DC-3 for long flights, a twin-engine Cessna 310 and a single-engine Cessna 180—can all take shelter in the 80x110-ft. hangar. In addition to usual maintenance and servicing facilities, the Dow-Texas airport has an omnirange radio beacon, so that its planes can "home in" to the field from any direction.



When accumulated lime (both illustrations show this condition) is scraped off the wheelbarrow coated with vinyl, only the battleship grey color shows through. However, the uncoated wheelbarrow (inset photo) already shows marked corrosion. Vinyl coatings were formulated by **Gates Engineering Co.**, Wilmington, Del.

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JULES SCHICK, PHILADELPHIA

INDUSTRY MEN* IN WRITING SCHOOL: For chemical companies, outside help on communications problem.

Piercing the Technology Curtain

If every businessman had a Ph.D. degree in science or engineering, it might be possible for them to communicate entirely in equations and data sheets. But since the world is so full of laymen, chemical companies are showing concern about a major gap-bridging problem: how to get directors, stockholders, managers and prospective customers to understand new developments in technology.

That would seem to explain why nearly one-third of the people enrolled in the recent conference on scientific and technical writing at the University of Pennsylvania (Philadelphia) were from major chemical, pharmaceutical and petroleum firms.

In all, 46 attended the conference, which was sponsored by the university's Institute for Cooperative Research and conducted by faculty member Harry Arader**. The class included scientists, engineers, editors and sales engineers responsible for preparation of internal and external company bulletins, reports, manuals, house organs, and other technical and semitechnical documents and articles. Represented: Allied Chemical, American Cyanamid, Du Pont, Smith, Kline & French, Sun Oil, and Tidewater Oil.

Attending by Direction: Advance registrations came in so promptly that enrollment was closed a full month before the conference started. Of the chemical process industry representatives questioned by *CW*, all reported that their companies had directed them to attend and that the companies were paying the $150-per-student fees. Smith, Kline & French (Philadelphia) had the largest contingent, with seven men enrolled.

Purposes of the five-day conference, according to Dr. Arader:

- To analyze basic concepts in communication of technical data.
- To provide practical instruction in preparation of effective technical reports.
- To provide each participant with a typical style manual and model report format designed to raise the standards of technical exposition.
- To promote informal exchange of information by industry people responsible for technical writing.

"Technical writing," Arader told his class, "has become a vital bridge not only between scientists, but also between research and industry, designer and manufacturer, maker and user, scientist and layman."

Big Equity in Bulletins: An advertising man from Alcoa pointed out that his company has "a tremendous equity in the bulletins it issues," wants to make sure its customers have effective applications of its products; "and it's important that our point of view is expressed effectively."

A Du Pont sales supervisor told of his company's large volume of technical bulletins going to processors, retailers, schools, laboratories and government, and explained that he enrolled to see how effective those bulletins are and how to make them more effective. "We've learned one thing," he commented. "In the past, too much writing has been at too high a technical level."

Technical writing courses are not new; they're being offered by various colleges on both credit and noncredit bases, and at least one other technical school—Rensselaer Polytech—has offered intensive instruction in conference form. But last month's sessions at Penn brought out the fact that chemical management is bearing down hard on the problem of piercing the technology barrier.

*Rehashing their lessons during break in lecture session: John de Bordenave, Du Pont (textile fiber sales); Kurt Gingold, American Cyanamid (research); William Fluty, Smith, Kline & French (exploratory development); Clayton Stebbins, General Chemical Division, Allied Chemical & Dye (planning research); Gorman Armstrong, Aluminum Co. of America; Arthur Turner, Jr., Smith, Kline & French (manufacturing division); and Bernard Keenan, Sun Oil Co. (standards engineering).

**Industrial liaison officer for research and lecturer on communication of technical information, Moore School of Electrical Engineering.

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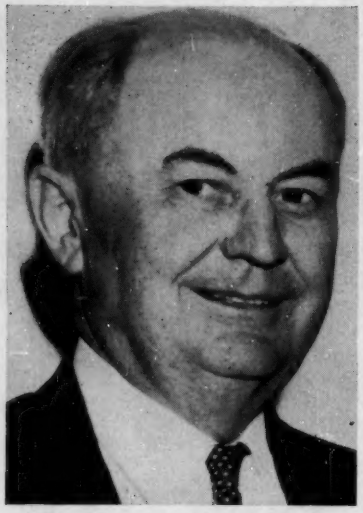


REPRESENTATIVE PATMAN: An end to good-faith defense.

LEGAL

Habit-Forming Drugs: The Dept. of Health, Education & Welfare has denied a petition by Tailby-Nason Co. (Cambridge, Mass.) to reopen hearings on the removal of acetylcarbromal and bromural from the Food & Drug Administration's list of drugs whose labels are required to bear the statement: "Warning—may be habit-forming."

The Cambridge firm, in essence, had charged that the department was wrong in finding that ambulatory patients are not satisfactory subjects for a clinical study of habit-forming potentialities of drugs. In denying that petition, H-E-W Secretary Marion Folsom said that evidence on this point could have been produced at either of the two previous hearings, and that it would prove nothing more than that some clinicians believe that ambulatory patients are suitable for such studies— contrary to the department's judgment based on testimony of a "highly qualified expert."

•

Suspension of Trade: The government's Bureau of Foreign Commerce has denied export privileges for one month to Gyma Laboratories of America (New York) and its vice-president, Rolf Lipton, for violations of export regulations.

BFC charged that Gyma—which will also have an additional two months' suspension held in abeyance against further violations—shipped drug products to a Zurich, Switzerland, firm knowing that the order had been originally placed by another Swiss company temporarily under suspension from all U.S. export privileges. BFC said that this was the first case involving violation of a denial order applicable to a third party.

BFC said its investigation disclosed the suspended company had apparently forged the order to Gyma on the Zurich firm's stationery. Gyma was not charged with knowledge of the forgery.

•

Good-Faith Defense: Rep. Wright Patman (D., Tex.), chairman of the House Small Business subcommittee in the past Congress, has promised to resume his battle in the 85th Congress for an end to the "good faith" defense to price discriminations.

Rep. Patman accused the Supreme Court of opening "a large loophole" in the Robinson-Patman Act when it approved the good-faith defense employed by Standard Oil of Indiana in the now famous Detroit case. He added that the good-faith proviso was designed to "correct" a similar provision of the Clayton Antitrust Act, not to be used "as a complete defense or an absolute bar to a charge of price discrimination irrespective of the economic consequences."

LABOR

Few Surprises: The Oil, Chemical & Atomic Workers (AFL-CIO) convention at St. Louis last fortnight (*CW, Sept. 1, p. 24*) produced few surprises for management men who've been dealing with this union. President O. A. (Jack) Knight and Secretary-Treasurer T. M. McCormick were re-elected without opposition; minimum and maximum monthly membership dues were raised by $1; and per capita tax —paid by locals each month to the union's international headquarters in Denver—was boosted 15¢ to $1.50.

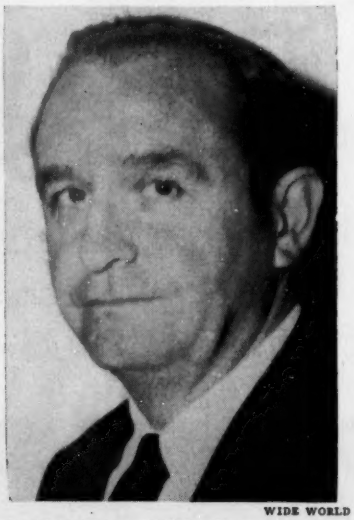
Biggest controversy came over the vice-presidential posts. After considerable wrangling, the 760 voting delegates decided to amend the constitution to provide for only two vice-presidents, instead of the four such offices set up when the union was formed by merger a year and a half ago.

When it came to balloting for the two positions, all four incumbents were nominated for re-election, but Jack Curran—OCAW's vice-president for Washington activities—withdrew from the race. On the roll call voting, Elwood Swisher—former head of the old Gas, Coke & Chemical Workers—and B. J. Schafer won out. Loser was Joe Appelbaum, former Gas-Coke official who has been in charge of organizing OCAW's company councils and industry councils.

The delegates—whose deliberations ran through 55 hours of actual convention sessions over a six-day stretch —adopted a resolution endorsing Democratic candidates Adlai Stevenson and Estes Kefauver. OCAW's next convention will be held in late summer or early autumn of 1957, at which time merger with International Chemical Workers Union (AFL-CIO) may be ripe for approval by the delegates.

•

For Technical Assistants: Anticipating more industrialization in the state and an increasing need for laboratory assistants and other technicians, Gov. Orval Faubus of Arkansas has appointed a committee to suggest ways of increasing the supply of this kind of manpower. One of his appointees—C. L. Stinnett of Monsanto Chemical's Lion Oil Co. Division—is broaching a suggestion for a program of technical education in state vocational schools. The committee's ideas will be presented to the next state legislature, which will convene in January.



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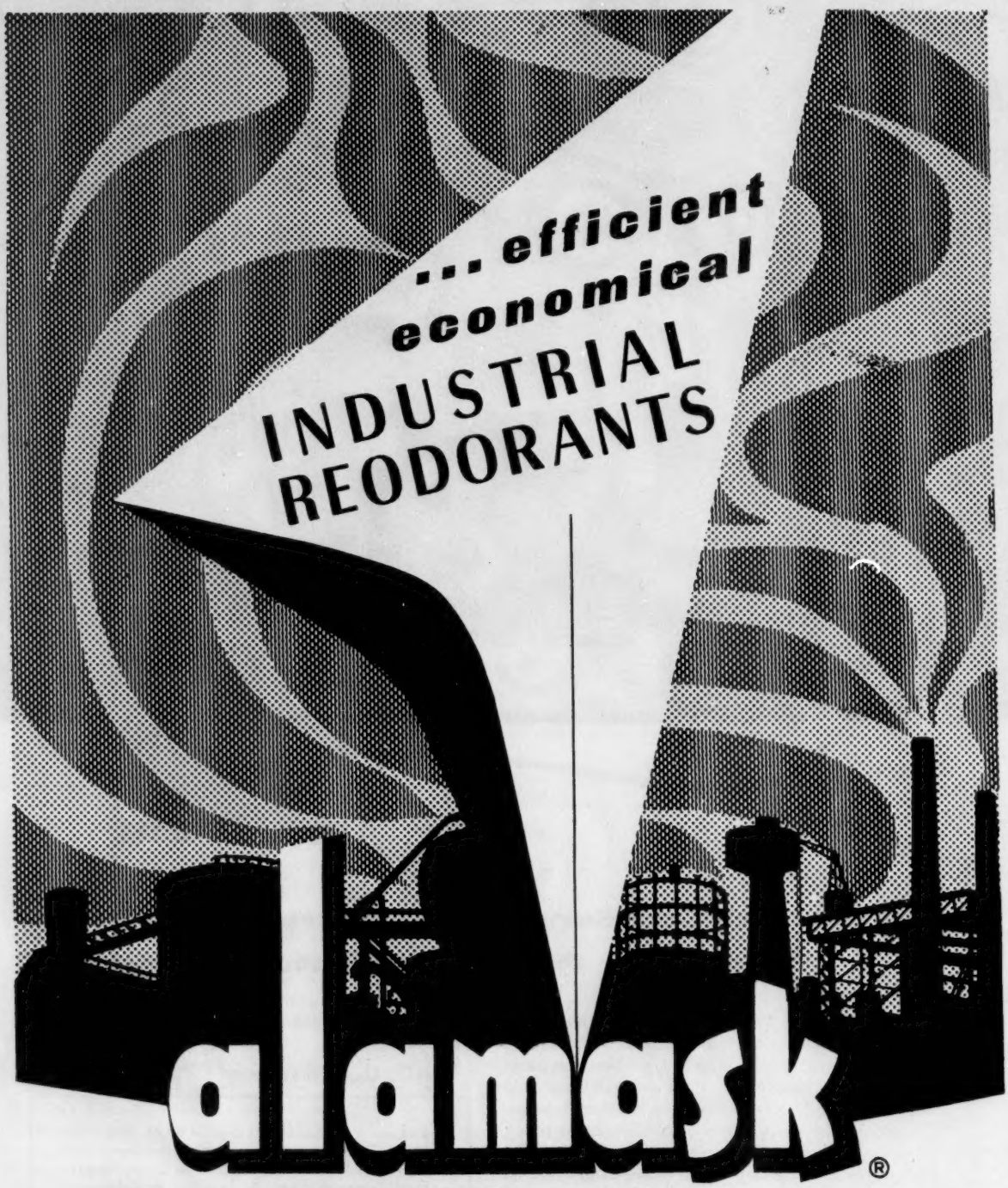

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KEY CHANGES

Max O. Debacher, to manager, overseas plastics manufacture; and **A. W. Low,** to director, overseas manufacture; Plastics Division (Springfield, Mass.), Monsanto Chemical (St. Louis).

Billy Kaye Moores, to director, Industrial marketing, Lehigh Chemical Corp. (Chestertown, Md.).

James R. Johnson, to technical coordinator, atomic energy program, Minnesota Mining & Mfg. (St. Paul).

Raymond E. Fiedler, to manager, argricultural products development, Archer-Daniels-Midland (Minneapolis).

John A. Handy, Jr., to vice-president, finance, and controller, Chemical Construction Corp. (New York), subsidiary of Electric Bond & Share.

Henry E. Wessel, manager, product development; and **Emanuel Heimberg,** to manager, market analysis; International Minerals & Chemical Corp. (Chicago).

John C. Virden, to director, Goodyear Tire & Rubber Co. (Akron, O.).

D. H. Francis, to director of engineering and member of executive committee; and **William O. Ranky,** to director of laboratories; Stepan Chemical Co. (Chicago).

O. R. McIntire, to technical director, textile fibers department, Dow Chemical (Midland, Mich.).

Bruno H. Wojcik, to manager, research and development, Industrial Chemicals Division, Olin Mathieson Chemical (New York).

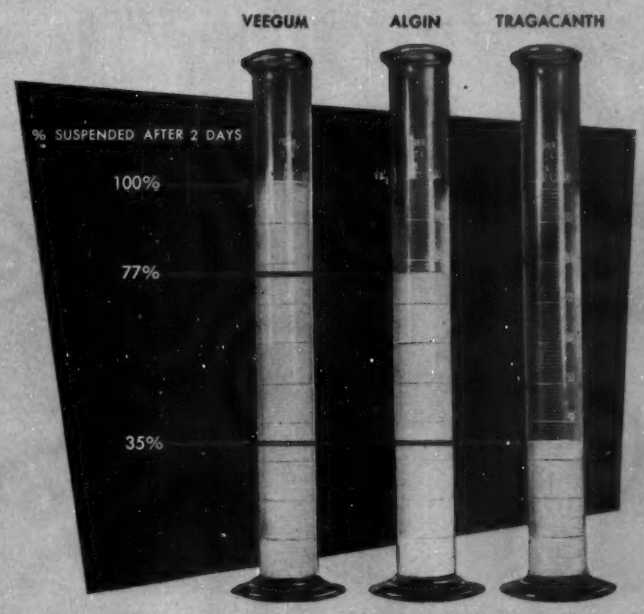
Paul N. Gillon, to manager, basic research branch, research laboratory, Carborundum Co. (Niagara Falls, N.Y.).

Frank L. Jones, to assistant manager, research, Koppers Co., Inc. (Pittsburgh).

RETIRED

Carl T. King, manager, overseas plastics manufacture, Plastics Division (Springfield, Mass.), Monsanto Chemical (St. Louis).

Karl P. Herbruck, vice-president and general manager, Wilson Rubber Co. (Canton, O.).



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FREIGHT CAR SHORTAGE: Shippers blast railroads in hassle before ICC.

Demurrage Discord

Chemical companies and other big users of railroad freight cars have won their fight against the railroads' proposed demurrage rate hikes (CW, Aug. 18, p. 102). Late last week, ICC ordered the rail industry to maintain present demurrage charges at least until March 31, 1957.

In all, some 480 firms and trade associations lodged protests with Interstate Commerce Commission against the new rates. Among them: Allied Chemical, Devoe & Raynolds, Federal Chemical, Colgate-Palmolive, Spencer, International Minerals, and Diamond Alkali, National Industrial Traffic League, and National Plant Food Institute.

Railroads sought these revisions:

- A charge of $4 for each of the first two days a company keeps a car after the regular two days free time allowed to unload or load it; $7/day for each of the next two days; $10/day thereafter. (Present rate: $3/day for the first four days after the two free days, $6/day thereafter.)
- Change in the method of computing detention time to include Saturdays, Sundays and holidays, under both straight and average plans, after a car has been held two days beyond free time. (These days are not counted as detention under present demurrage rates.)
- Reduction from four days to two of the maximum debit period per car, which, under average agreements, can be offset by credits.* Cars that have accrued a two-day debit will be charged $7/day for the next two days, $10/day thereafter, including Saturdays, Sundays and holidays.

Railroad Rationale: Railroads gave two reasons for requesting the hike: first, to speed up turn-around of freight cars, and thus alleviate the freight car shortage; second, to help offset increasing costs of car ownership and maintenance. Last permanent increase in demurrage rates occurred in 1949 when it jumped from $2.20 for the first two days after two days' free time and $5.50 thereafter, to its present rate.

Who's to Blame? In blasting the demurrage hike before ICC, shippers blamed the railroads for car detention and shortages. National Industrial Traffic League, through its Car Demurrage & Storage Committee Chairman John Wilharm, told ICC: "The instances where cars are not loaded or unloaded within the free time, or in not over three or four days, predominantly represent situations beyond the control and duty of the shippers or consignees and arising from circumstances for which the railroads are more generally responsible."

National Plant Food Institute backed this stand, also presented figures intended to prove that the shortage of freight cars was brought about by the railroads. In 1954, NPFI points out, the railroads retired 68,869 freight cars, installed only 28,405 new ones. In '55, they retired 91,879 old cars and installed 35,788 new ones. The result: an over-all reduction of 81,920 freight cars in two years—to 1,694,097 in Jan. '56. Since railroads say that the peak shortage was 22,659 cars, NPFI claims that if the car fleet hadn't been allowed to decrease so drastically, there wouldn't have been any shortage at all.

Hidden Costs: The NIT league criticized the steepness of the proposed changes. Railroads label it as a 33⅓% increase in the basic rate, but the league insists that the rate pyramids because of the change in rules.

For example, says the league, "a representative Ohio industry member of the league has examined its actual demurrage charges for the most recent month available, May '56, and restates these charges on the basis of the proposed rules and rates, with the result that the total actually paid, $7,515, would jump to $35,560—an increase of 473%."

Similarly, members of Eastern Industrial Traffic League have estimated that increases in their demurrage bills would climb as high as 266%. National Plant Food Institute (representing companies that produce and market more than 75% of all U.S. fertilizer and fertilizer materials) figures that demurrage costs would more than double under the new rates.

A steel company in Chicago gives demurrage figures of $25,842 collected in the month of May, against $75,619 that would have been exacted under the proposed change, an increase of 293%. By and large, shippers say the hike in rates will amount to a 100-200% increase.

Railroad 'Bad Practices': Labeling the matter as an undue punitive charge against shippers, International Minerals called on the railroads to "clean up some of their own bad practices" before putting extra burdens on

*Under average agreements, a shipper is debited by the railroad for the time that cars are held for loading or unloading beyond the two days free time, and is credited for the time that cars are released by him within the free time.

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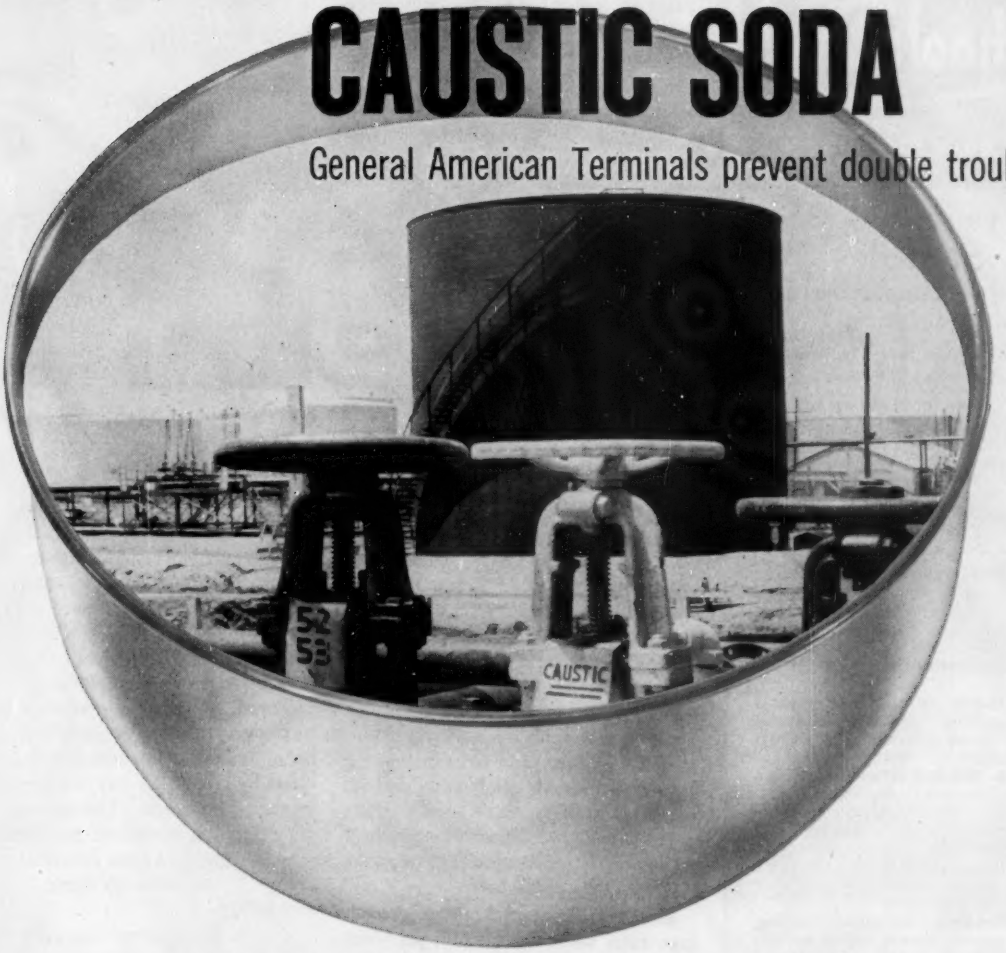

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Gravies-Sauces—prevents fat separation.
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shippers. These practices were spelled out: "Delay of freight cars because of lack of locomotive power; lack of an adequate manpower pool for the repair of freight cars; five-day week; inadequate switching service; lack of courage in enforcing a clean car program through a system of tariff charges."

W. G. Nelson, general manager of Southwest Fertilizer and Chemical of El Paso told ICC that "due to the present poor service we receive from railroads, the inequitable rates between various points and their continued demands for ever-increasing rates, it is our feeling that this increase would antagonize shippers to the point where they would further reduce rail shipments, bring about an over-all loss of revenue for the railroads. . . . I can say for this company that we have been able to decrease our rail shipments better than 10% after Ex Parte No. 196 went into effect, by changing shipments from rail over to truck." (Ex Parte 196 was the general 6% freight rate increase granted to the railroads last March.)

No Expiration Date: Key point bothering shippers is that the new charges would be permanent. Normally, when emergency car shortages arise, the railroads issue service orders that hike demurrage rates for stated temporary periods (they went as high as $20/day in World War II). However, these service orders always carry expiration dates; the present proposal does not.

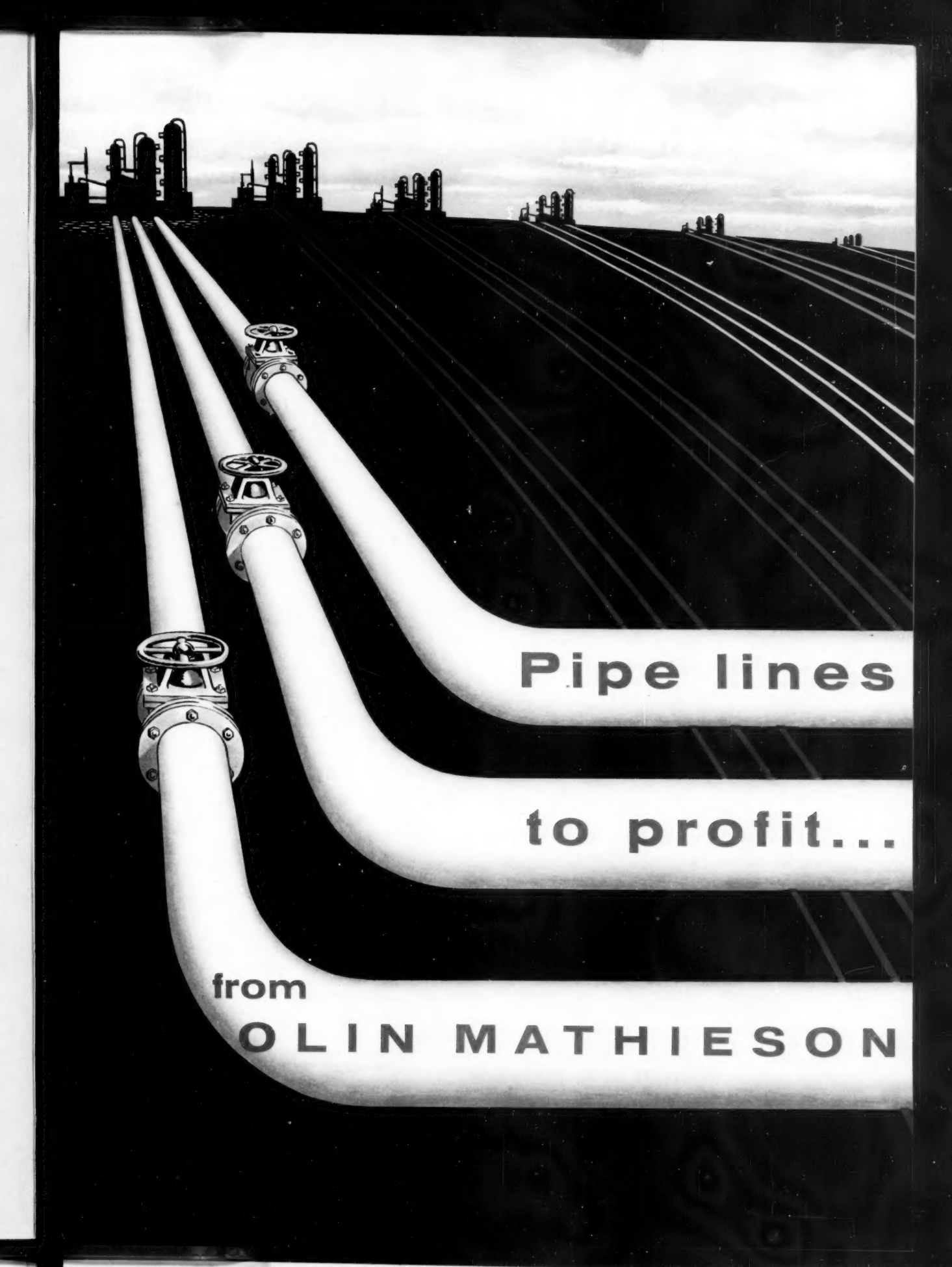
Shippers also resent stiffer demurrage rates when the current per diem charge that railroads pay each other for the use of their cars is only $2.40. Although the latter has increased by some 37% since 1949, many shippers think it's still too low. A higher per diem charge, they argue, would spur railroads to handle cars faster and likely help the present car shortage far more than higher demurrage rates. Many shippers believe that until the per diem charges are adjusted to take the profit out of using 'foreign' equipment, there never will be an adequate freight car supply.

The railroads' proposal to start counting Saturdays, Sundays and holidays as payable demurrage days was attacked vigorously by shippers. Prime argument was that the nation operates on a five-day week, with labor agreements all geared to this. To bring out a labor force to handle freight cars would cost companies more than the extra demurrage charge, with the result that there would be little net gain in making more freight cars available. Doubt was also expressed whether railroads would move freight cars even if they were ready on these days.

NITL'S WILHARM: Blames railroads for freight car shortage.

There was considerable resentment, too, toward the proposal to cut down on maximum debit time that could be offset by credits for any one car under average agreements. The move would cut down the incentive that shippers now have to turn cars around quickly and pick up credits on them, shippers told ICC.

One thing apparent from the whole issue is that shippers across the country are ready to demand more action on the part of the railroads in solving the perpetual car shortage, and are not willing to have undue blame placed on them for aggravating the situation. In the words of one protesting group: "The carriers are entitled to fair and reasonable compensation for delays in unloading freight cars when the delays are not the fault of the railroads. Conversely, the railroads should not be permitted to profit from, nor the shippers penalized because of, the carriers' own default. It is per se unreasonable to assess the same severe penalties for avoidable and unavoidable delays alike, for car detention with and without fault of the shipper, and without regard to the culpability of the carriers."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Bicarbonate of Soda. U.S.P., Powdered and Granular; Miller's Special Regular and Miller's Special No. 2; and Fine. 100-lb. moisture-proof paper bags from Saltville, Va.

Carbon Dioxide. Carbonic Gas, in tank cars from Saltville, Va. and in 20-lb. net cylinders and 50-lb. net cylinders from Saltville, Va. and 17 Olin Mathieson-operated warehouses from New York to New Orleans. Dry Ice, in 55-lb. blocks from the same plant and warehouses.

Caustic Potash. 45% Liquid, in tank cars from Niagara Falls, N. Y.

Caustic Soda. 50% Liquid and 73% Liquid, Rayon Grade and Commercial Grade, in 8,000-gal. and 10,000-gal. insulated and lined tank cars, from Lake Charles, La., Niagara Falls, N. Y., Saltville, Va. and McIntosh, Ala.; also Commercial Grade from Huntsville, Ala. 50% Liquid available in barges and tankers from Lake Charles, and in barges from McIntosh and Huntsville. 76% Solid and Flake, from Lake Charles and Saltville. 76% Granular, Ground, and Powdered Caustic, and MCC Flake Bottle Wash, from Saltville.

Chlorine. Liquid, in 16-ton, 30-ton, and 55-ton single-unit tank cars from Niagara Falls, N. Y., Huntsville, Ala., McIntosh, Ala., Saltville, Va., Arvida, Que.; also in multi-unit tank cars of 15 tons from Niagara Falls, N. Y., and Huntsville, Ala.

Muriatic Acid. 18° Bé. (27.92% HCl) and 20° Bé. (31.45% HCl), in tank cars from McIntosh, Ala.

Nitrate of Soda. Synthetic, prilled, in 100-lb. multi-wall paper bags (palletized loading optional) and bulk carloads (box or hopper cars), from Lake Charles, La.

Nitric Acid. 60%, in tank cars and tank trucks from Lake Charles, La.

Soda Ash. From Saltville, Va.: Light, in 100-lb. multi-wall paper bags and in bulk carloads; Coarse Light, in bulk carloads. From Lake Charles, La.: Light, in 100-lb. multi-wall paper bags and in bulk carloads, also in barges and ocean steamers; Dense No. 1, in 100-lb. multi-wall paper bags and in bulk carloads; Dense No. 2, in bulk carloads; Intermediate, in bulk carloads.

Sulphate of Alumina. Activated Alum Brand, from Baltimore, Md. in multi-wall paper bags.

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Sulphuric Acid. Available in the following grades: 60° Bé. (77.67% H_2SO_4), 66° Bé. (93.19% H_2SO_4), 98% H_2SO_4, 99% H_2SO_4, 100% H_2SO_4 and Oleum 20% (104.5% H_2SO_4). Shipping points: Baltimore, Md., Little Rock, Ark., Bossier City, La., Beaumont, Tex., Port Arthur, Tex., Pasadena, Tex., and Palmerton, Pa. Available from all plants in tank cars and tank trucks; also barge shipments from Baltimore, Md.

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Ethylene Oxide. Used in production of surfactants, ethylene glycol, acrylonitrile, acrylate esters, ethanolamines, glycol ethers and fumigants. Tank cars and insulated returnable drums (400 lbs. net) from Brandenburg, Ky.

Ethylene Glycol. Used as an engine coolant and in the manufacture of dynamite, cellophane, hydraulic fluids, and resins. Tank cars, compartmented cars, tank trucks, and resin-lined drums (500 lbs. net) from Brandenburg, Ky.

Diethylene Glycol. Used as solvent, humectant, dehydrant and intermediate. Tank cars, compartmented cars, tank trucks, and resin-lined drums (500 lbs. net) from Brandenburg, Ky.

Triethylene Glycol. Used in gas dehydration, as a humectant and in production of emulsifiers, lubricants and polyesters, and as an air-treating agent. Tank cars, compartmented cars, tank trucks, and resin-lined drums (500 lbs. net) from Brandenburg, Ky.

Polyethylene Glycols: Poly-G 200, Poly-G 300, Poly-G 400, Poly-G 600, Poly-G 1000, Poly-G 1500, Poly-G B1530. Used as humectants and in production of surface-active agents, cosmetics, and pharmaceuticals. Tank cars, compartmented cars, tank trucks, and resin-lined drums from Brandenburg, Ky.

Glycol Ether Solvents: Poly-Solv EM (*e*thylene glycol mono*m*ethyl ether), Poly-Solv DM (*di*ethylene glycol mono*m*ethyl ether), Poly-Solv EE (*e*thylene glycol mono*e*thyl ether), Poly-Solv DE (*di*ethylene glycol mono*e*thyl ether), Poly-Solv EB (*e*thylene glycol mono*b*utyl ether), and Poly-Solv DB (*di*ethylene glycol mono*b*utyl ether). Excellent solvents for dye-

stuffs, oils, waxes and resins. Valuable for improving flow-out and minimizing undercoat lifting of alkyd baking enamels, phenolic and epoxy coatings, cellulose and vinyl lacquers. Also used as components of brake fluids, metal and glass cleaners, dry cleaning soaps, "soluble" textile and metal cutting oils and as intermediates for a number of plasticizers. Tank cars, compartmented tank cars, tank trucks, and resin-lined drums from Brandenburg, Ky.

Ethylene Dichloride. Used as an extractant for alkaloids, vitamins and hormones, as a component of grain fumigants, cleansing agents and herbicides, and as a solvent for cellulose esters, fats, waxes, and resins. Tank cars, compartmented cars, tank trucks, and drums (550 lbs. net) from Brandenburg, Ky.

Dichloroethylether. Used as soil fumigant, insecticide and high temperature solvent. An extractive of butadiene and naphthenic compounds. Tank cars, compartmented cars, tank trucks, and drums (550 lbs. net) from Brandenburg, Ky.

Formaldehyde. Available in four grades—37% inhibited, 37% low methanol, 45% low methanol and 50% low methanol (other grades also offered)—in tank cars and tank trucks from Morgantown, W. Va.

Methanol. Tank cars, compartmented cars, barges, tank trucks and drums (358 lbs. net) from Morgantown, W. Va.

Hexamine. As chemical intermediate, hexamethylenetetramine provides water-free formaldehyde and tertiary amines. Useful in resin manufacture. Multi-wall paper bags (80 lbs. net) and fiber drums (100 lbs. net) from Morgantown, W. Va.

Ethylene Diamine. Used in the synthesis of ethylene diamine tetracetic acid salts (chelating agents), and surfactants; forms resinous polymers with formaldehyde resin systems. Tank cars, tank trucks, returnable tin-lined drums (430 lbs. net) from Morgantown, W. Va.

Polyamines 333 and 910. Semi-refined, liquid mixtures, used in the preparation of asphalt additives, corrosion inhibitors, emulsifiers, demulsifiers and wetting agents. Tank cars, compartmented cars, tank trucks, and drums (430 lbs. net) Morgantown, W. Va.

Ethanolamines. Mono-, di-, and triethanolamine are used in preparation of surfactants for a variety of applications and as absorbents in gas scrubbing. Tank cars, compartmented cars, tank trucks and drums from Brandenburg, Ky.

Trichlorobenzene. Technical, used in manufacture of trichlorophenol and dye intermediates, as a heat transfer medium and in compounds for carbon cleaning and engine scavenging. Tank cars and drums (675 lbs. net) from Niagara Falls, N. Y.

Polychlorobenzene-100. Used in preparation of aquatic herbicides, termite control formulations, and in compounds for carbon cleaning and engine scavenging. Tank cars and drums (650 lbs. net) from Niagara Falls, N. Y.

Trichlorophenol. Used in synthesis of bactericides, herbicides and fungicides. Flaked material in fiber drums (200 lbs. net) and fused material in steel drums (600 lbs. net) from Niagara Falls, N. Y.

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Hypochlorite Products are available in a number of forms and packages, each adapted to a specific application: HTH Granular for use in water treatment as an efficient chlorine carrier and disinfectant; HTH Granular Bleach for use in preparing uniform bleach solutions in the power laundry; HTH Tablets and the HTH Tablet Hypochlorinator for accurate "metering" of hypochlorite solutions and also the tablets for direct hand feeding. Lo-Bax Special, LoBax-W and HTH-15 are chlorine sanitizing agents for dependable sanitation on dairy and poultry farms, in dairy and other food plants, and in food and beverage service. Ad-Dri Bleach, for dry addition to the commercial laundry plant washer, and HTH Soda Bleach Mix, are other HTH products for laundry bleaching. Literature upon request.

Sodium Chlorite Products include Technical Sodium Chlorite, Textone and C2, all serving primarily as a convenient and economical source of Chlorine Dioxide (ClO_2), a powerful oxidizing agent containing the equivalent of 263% available chlorine. Widely used in potable water treatment, textile processing and bleaching of paper pulp. Sodium Chlorite Products are shipped in 25-lb. pails and in 100-lb. lithographed steel drums from Niagara Falls, N. Y.

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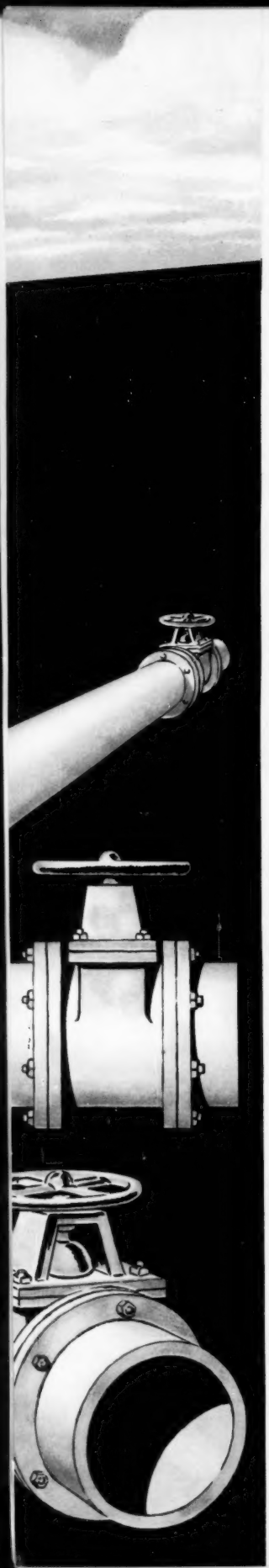

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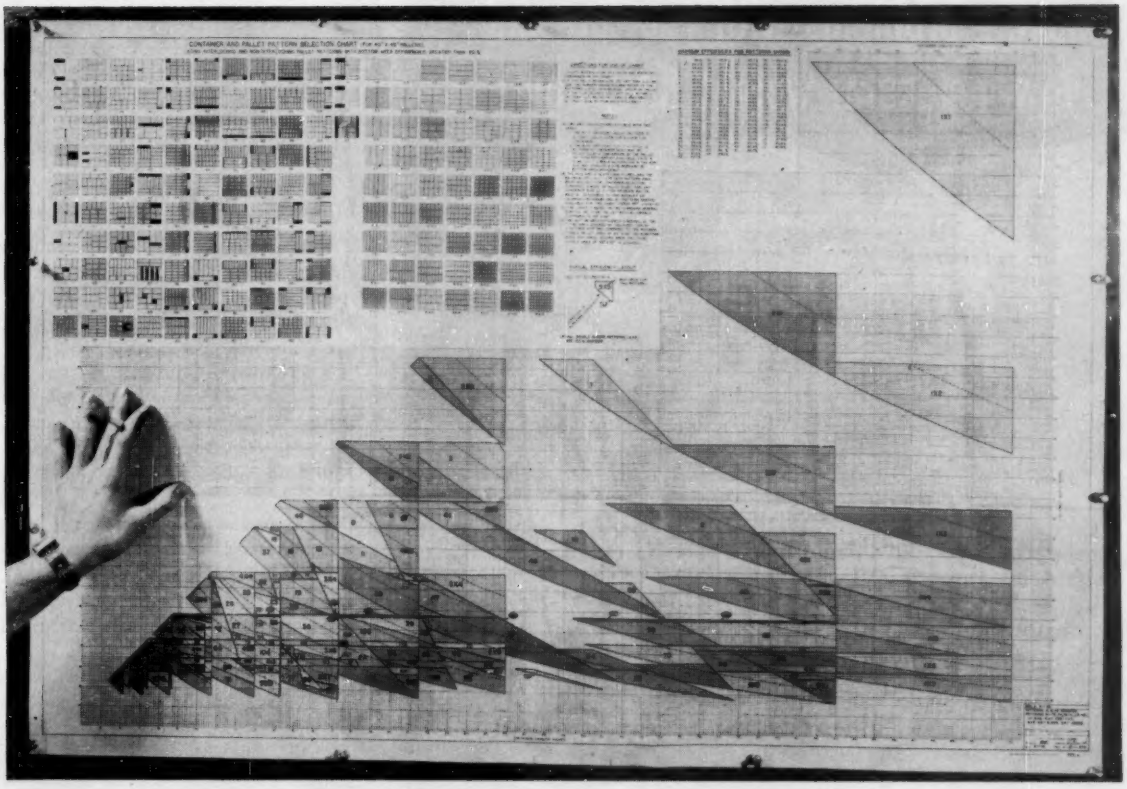

MASTER CHART from recent Navy study provides fast way to determine efficiency of warehouse palletizing practices.

Palletizing: New Guide to Space Saving

Making the most efficient use of pallet space for transportation and warehousing always calls for a lot of work with slide rule and tape measure—not always with optimum results. Aimed at eliminating much of this tedious job is a just-out report on a 16-month study of palletizing problems conducted by the Navy's Bureau of Supplies and Accounts.*

Prepared by J. P. Akrep and S. Stambler, the study is intended as a general aid in improving warehousing practices. More specifically, it gives a new and simplified method of determining the most efficient loading pattern for any given container size on a standard-size pallet. Heart of the report is a collection of six master charts—practically errorproof—which gives at-a-glance answers to problems of utilizing container sizes to get maximum economies in warehousing and transportation of unit loads.

The charts are boiled-down results of the Navy's efficiency tests of all known patterns for pallet loading. Of some 448 patterns, only 172 remained after all the duplicates and those that were less than 80% efficient were eliminated. These 172 (63 non-interlocking, 109 interlocking) are represented on the charts, cover approximately 20,000 container sizes in increments of ⅛ in. with lengths from 6 to 52 in. and widths from 5 to 43 in. The best pallet pattern for any size of container can be determined quickly by locating on the chart the intersection corresponding with the container lengths and widths.

The study points out that industry generally uses haphazard loading patterns, that it seldom uses the allowable overhang on the standard-size pallet. Figuring 10% as the saving to be realized by more efficient palletizing, the Navy study found the following space reductions are possible:

- Warehousing—an additional 900 tons and 60,000 cu ft. can be realized in a standard 200x600-ft. Navy warehouse, assuming a floor area utilization of 50%, a stacking height of 10 ft. and an average density of 30 lbs./cu. ft.
- Boxcars—an additional 3½ tons and 230 cu. ft. can be realized in a standard 50-ft. boxcar with pallets loaded 2 pallets high, 2 across and 13 along the length of the car, assuming an average net of 45 cu. ft. per pallet and an average density of 30 lbs./cu. ft.
- Highway trucks—an additional 1,350 lbs. and 45 cu. ft. can be realized in a standard 24-ft. highway truck loaded 2 pallets wide, 1 across and 5 along the length of the truck, assuming an average net of 45 cu. ft. per pallet and an average density of 30 lbs./cu. ft.

Copies of the study, including the six fold-out master charts, are avail-

*Its title: Container Size and Pallet Pattern Selection Criteria for Use on 40x48-in. Pallets. Cost: $3.

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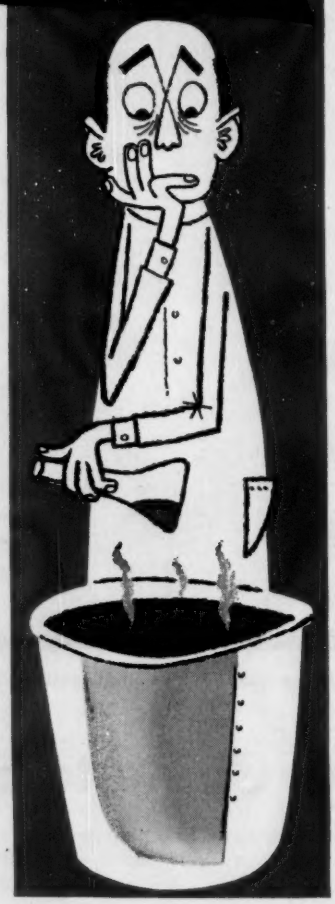

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Boiling Point, °C at 760 mm.	238	255	270	299
Iodine Value	1	nil.	1	1
Acid Value	390	350	325	280

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Utilization of the study is sure to save space, costs and—perhaps most important of all—even tempers.

DATA DIGEST

- **Bromine:** 29-p. brochure contains data on chemical properties, uses, specifications, decontamination and safe handling practices. Dow Chemical Co. (Midland, Mich).
- **Price list:** 8-p. folder gives revised prices for company's line of plastics materials, laboratory ware, plastics processing machinery and other items. American Agile Corp. (Maple Heights, O.).
- **Agricultural chemicals:** 28-p. booklet offers information on insecticides, soil fumigants, allyl alcohol, and use of ag-chemicals for crop and noncrop purposes. Shell Chemical Corp. (New York).
- **Phenolic resins:** Separate booklets cover properties and applications of three molding powders. A one-stage phenolic compound is the subject of booklet CDC-324; two general-purpose phenolic materials are described in booklet CDC-326. General Electric Co., Chemical Materials Dept. (Pittsfield, Mass.).
- **Paint manual:** Brochure presents information on use of specialized protective coatings. Table of chemical-resistance data, hints on surface preparation and paint application, maintenance procedures, and description of company products are given. No. 760. U.S. Stoneware Co., Plastics and Synthetics Division (Akron).
- **Antioxidant:** 8-p. folder outlines use of 2,6 ditertiary-butyl-*p*-cresol in preventing oxidation of such hydrocarbons as gasoline, waxes, rubber, plastics and drying oils. Catalin Corp. of America (New York).
- **Rubber compounding:** Bulletin presents detailed technical information on formulation of rubber products with thermoplastic resins. Physical and electrical properties of the resins, test and strain data, and test recipes are included. Velsicol Chemical Corp. (Chicago).
- **Polyester felts:** Booklet gives data on tensile strength, vibration insulation, thermal conductivity, friction coefficient, chemical resistance and resilience of Dacron nonwoven felts.

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TITANOX white pigments are the No. 1 choice for whitening, brightening and opacifying industrial product finishes—just as they are for paper, plastics, paints, rubber, ceramics and anything that needs white pigment. Titanium Pigment Corporation (subsidiary of National Lead Company), 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1; Vancouver 2.

*TITANOX is a registered trademark for the full line of titanium pigments sold by Titanium Pigment Corporation.

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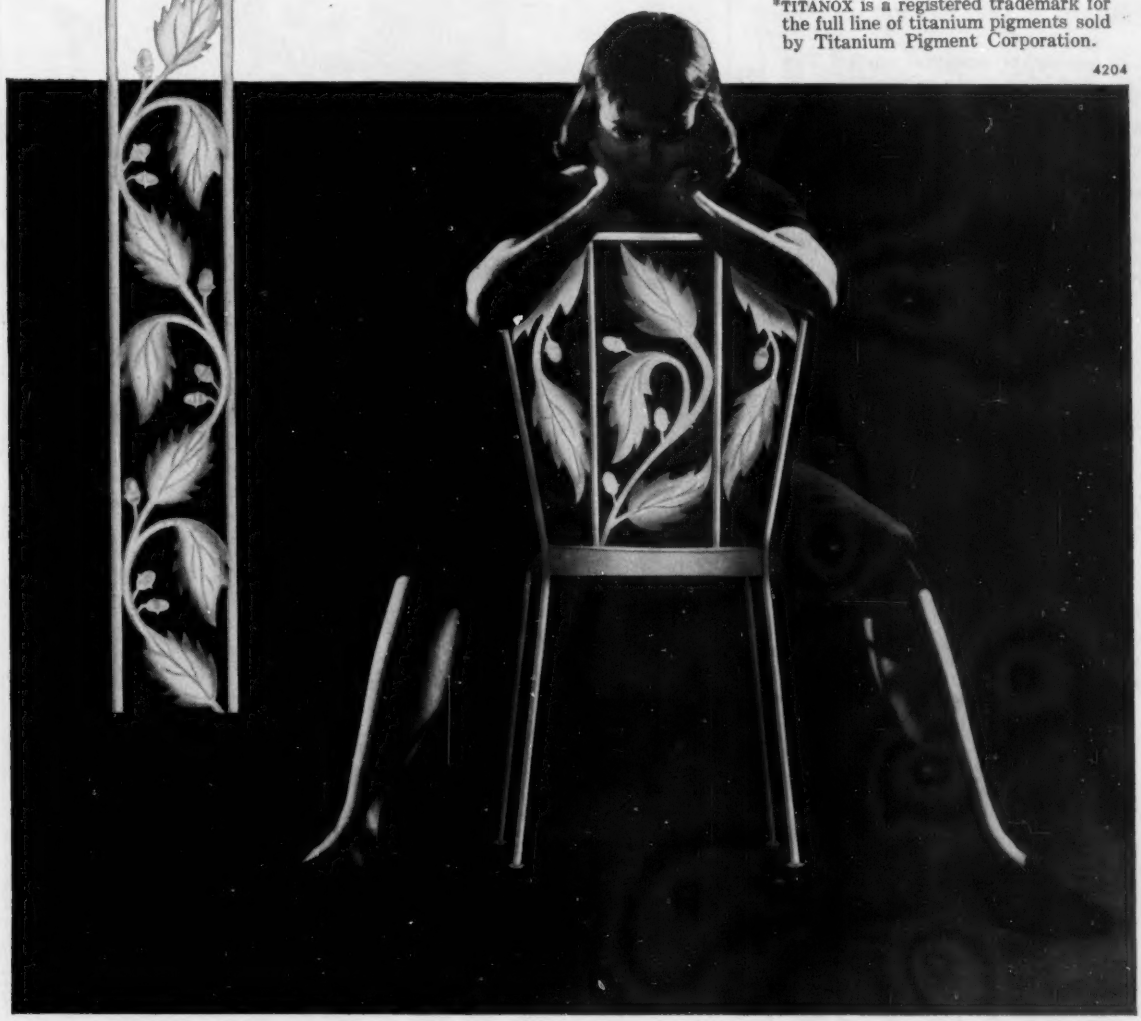

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SALES

E. I. du Pont de Nemours & Co., Inc., Textile Fibers Dept. (Wilmington, Del.).

COMPETITION

• Globe Chemical Co. (Cincinnati) has been named distributor for electrolytic plating processes by Du Pont.

• Harchem Division, Wallace & Tiernan, Inc. (Belleville, N.J.), has opened a new Eastern shipping and storage depot for oleic acid.

• Monsanto Chemical Co. is opening a new district office and warehouse at Los Angeles.

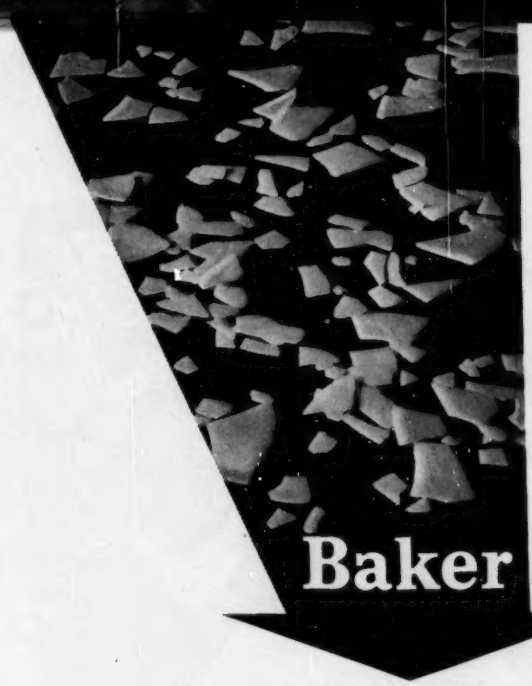
• New chemical distributor, Inland Chemical and Solvent Corp. (Toledo), has begun operations.

• Eastman Chemical Products, Inc. has opened sales offices in The Hague, Netherlands.

• Hooker Electrochemical Co. has completed its consolidation of sales offices of Durez Plastics Division and Niagara Alkali Co.

Prod for Procrastinators

THE NATION'S MOTORISTS will buy their antifreeze before the first winter cold snap, if Dow Chemical's new campaign pans out. The Dow poster (*above*) is already on the way to service stations, will be seen there during the fall to prod Johnny-come-late car owners into action. In addition, Dow will have "spot" announcements on 35 radio stations beginning in October, and will sponsor the NCAA Football Scoreboard weekly (Saturdays) on 100 TV stations. Ads in *Time*, *Sports Illustrated*, etc., are also planned.



Here's news!

Baker CALCIUM NITRATE, Tech.
ZINC NITRATE, Tech.

in THIN FLAT FLAKES

- *Faster dissolving*
- *Uniform purity—lot after lot*
- *Controlled water of hydration*
- *Easier to handle*

Look over the photograph above, reproduced to actual size. Note the thin flakes with large surface area. THIN FLAKES go into solution FAST – you save time and money. They are easy to handle. These chemicals in *flake* form represent another Baker first.

Latex processors gain better control of coagulation because of the controlled high assay and known water of hydration. This uniform purity, controlled pH and freedom from extraneous matter insure better quality in your finished goods with fewer rejects.

These chemicals are produced to meet precise specifications. In the informative typical analysis shown below, note the very low ammonium nitrate content in Baker Calcium Nitrate. The exceptionally low copper and manganese contribute to longer life for your latex products, with less tendency to oxidize and become brittle or too soft.

These features of Baker Calcium Nitrate and Zinc Nitrate also are helpful to manufacturers of rustproofing specialties, textile finishes, pigments, adhesives and lithographic materials.

Because of the low melting points and deliquescent nature of these chemicals, they are packaged with polyethylene liners and are stored in an air conditioned warehouse at a temperature below 85°F.

Write for samples and prices for these new *flaked* products, Calcium and Zinc Nitrate Technical.

CALCIUM NITRATE, Technical Flake	*Typical analysis*
Assay (as $Ca(NO_3)_2$)	71.8 %
Water of Hydration	27.6 %
Insoluble and NH_4OH Ppt.	0.03 %
Ammonium Nitrate (NH_4NO_3)	0.1 %
Magnesium & Alkalies (as NO_3)	0.4 %
Iron (Fe)	0.0003%
Copper (Cu)	0.0004%
Manganese (Mn)	0.001 %
pH of 5% Solution	6.3
Thin (0.025 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	45%
Thru U.S. No. 20	8%

ZINC NITRATE, Technical Flake	*Typical analysis*
Assay (as $Zn(NO_3)_2$)	74.2 %
Water of Hydration	25.6 %
Insoluble Matter	0.008 %
Iron (Fe)	0.001 %
Lead (Pb)	0.005 %
pH of 5% Solution	5.1
Thin (0.035 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	26%
Thru U.S. No. 20	9%

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Seasoned Staffers Spark Recruiters' Zeal

Today, when research is growing so fast and experienced researchers are so hard to get, it's not surprising that chemical companies are reaching new highs in their recruiting vigor. The attempt by one firm to win another's researcher has become widespread, and is freely referred to as "pirating," although most research executives agree that the choice of word may not be the best.

Who's Wanted: A Midwestern firm (that's lost 5 key men to competitors since January) sizes up the typical researcher who's most vulnerable to being spirited away as being 29-33 years old, unusually capable, and making $8-11,000/year. In his present job, the next big step is 3-4 years off. And even with that, things look slow up to age 40. As a Ph.D. fresh out of school, he received $600/month, has now advanced to near $1,000—which is often what his colleagues with 10 years experience are getting.

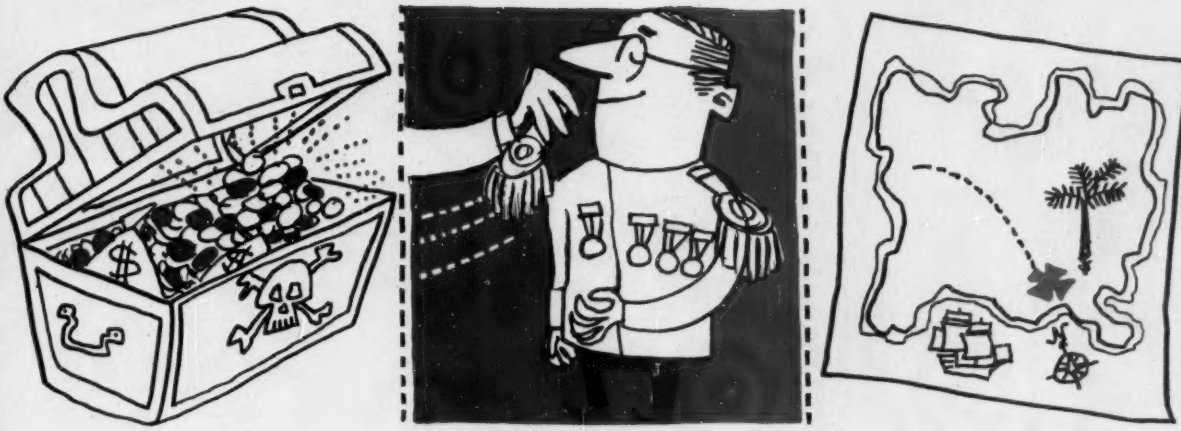
Backing this picture of the perfect specimen is the almost unanimous agreement that offers are most likely to hit men with 5-10 years experience —rarely under 5 and generally not over 10. (One exception: a report of "increasing offers of research directorships to our top men with over 20 years experience, generally originating in companies just getting into chemicals, such as pulp and paper companies, small oil companies, etc.")

Another highly susceptible type is the specialist who can be offered greater opportunities for concentration in his favorite field. Age or experience makes little difference here. Top demand is reported for nuclear specialists, inorganic and polymer chemists, and for career researchers in analytical methods. ("Analytical chemistry just isn't glamorous, and it takes a whale of a lot of know-how.") Regardless of specialty, the biggest need appears to be for original thinkers in applications research, since a high percentage of really creative men drift into basic research, "probably because of initial direction in graduate school."

What's the Prize? Biggest and most common lure to the prospective abdicants is more money. Close behind is the opportunity for added responsibility. But researchers who have unsuspectingly expressed interest (at meetings, etc.) in particular geographic areas may find themselves approached by representatives of companies with laboratories there. In general, the dissatisfied man is the most likely candidate for "pirating." He may feel his chances of progress are limited because the company itself is at fault (e.g., where products he's developed take too long to get on the market and gain him recognition). An opportunity to alleviate this real or imaginary hardship may be all the incentive he needs to quit. What's more, talent hunters have reportedly been helped in recent years by professors who counsel graduates to move from job to job while they're still young, have a chance to pick the firm that suits them best.

How They Do It: Despite the hard-sounding name of this practice of hiring away researchers from other companies, a code of ethics (unwritten) does govern its *modus operandi*. To wit: use of the personnel director or staff recruiter to contact the prospec-

LURES



MOST COMMON LURE is more money, but higher rank and appealing work location are also prevalent.

tive employee is nearly always shunned. In its stead, most chemical firms prefer to have a top, highly respected, member of their research staff act as the agent, although any staff member may take on this assignment. If the desired man is an acquaintance, the conversation about the new job may be direct and to the point. Otherwise, the contact may be made at a convention or technical meeting. Often, a staff member is the first to know of a good prospect, is therefore the most logical person to sound the latter out.

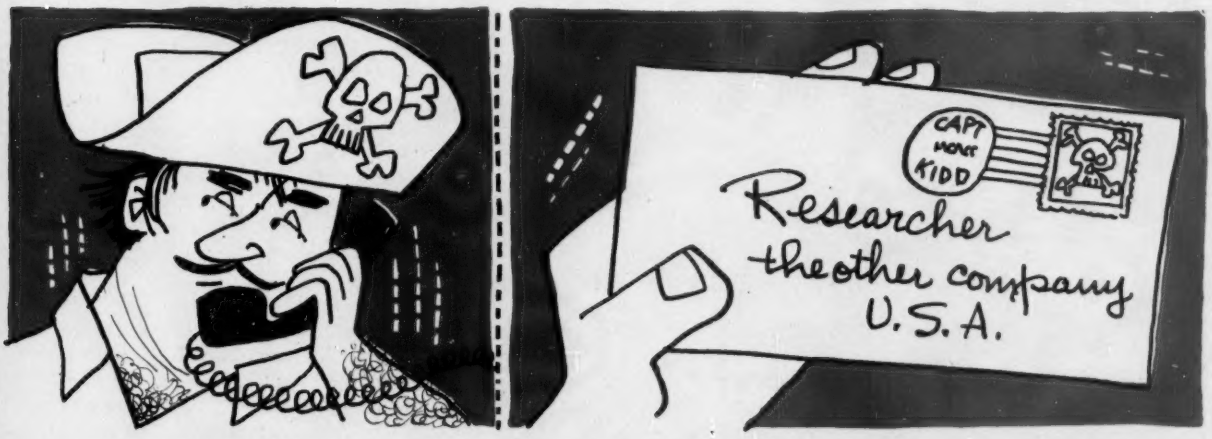
Another device (gaining in popularity) may be used when chemical firms are particularly anxious to enlist a well-known specialist who cannot be contacted by an employee. That's to get an outside management personnel agency to write him, referring to his established reputation in the field, asking if he would know anyone interested in a position (which coincidentally calls for the addressee's qualifications) at a salary higher than he is getting. Result: the addressee frequently accepts the new position himself.

Big or Small? Nor does it matter particularly if the firm is large or small. Small companies, desperate to staff expanding research programs, may prey on the larger companies. Even if the mismatched (for size) firms are doing business together, the smaller one can often "pirate" without fear of economic reprisal. Reason: the smaller firm can utilize a tactful approach, sew up a deal with the larger company's man, then explain his opportunity to management of the larger firm. A typical large-firm attitude is: "Almost everybody is our customer, and we don't want to get them mad at us. Also, it's to our advantage to have good men on our customers' staffs."

Conversely, large firms have more vacancies, may eye small-firm staffers to fill them. And both may lose men to better-paid government positions.

How to Hold Them: A number of firms, both large and small, are convinced there's no defense against "pirating," at least no blanket defense, except

TECHNIQUES



DIRECT CONTACT by a top member of research staff; or 'not too heavily disguised' offers by a personnel agency.

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THE GENERAL TIRE & RUBBER CO.,
Chemical Division, Akron, Ohio.

Creating Progress Through Chemistry

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Akron, Ohio

Please send me a copy of your booklet on Vygen 1101 Compound.

Name_____

Company_____

Street_____

City_____ State_____

to see that researchers are kept as happy as possible. However, contractual agreements may offer some insurance (*CW, Nov. 26, '55, p. 28*). Typical: an employment contract that specifies the researcher can't work for a competitor for one year if he quits on his own. If fired, he's free, however.

Another way of keeping researchers is the so-called "golden handcuff." Says the research director of a prominent Eastern firm: "We fight fire with fire. We give our people pension plans, stock options and other programs that pile up benefits. If they leave, they lose most of them."

Some few feel that no special effort is necessary, that the ones who are changing jobs frequently are opportunists who couldn't be tied down in any case. One research administrator claims that researchers hired through special enticement are not likely to stay more than two years in any one place.

Roving Souls? Larger firms, especially, seem to find an element of unrest in a research man's makeup, may make no effort to counter a better offer with a pay raise. Some even feel that a good researcher must, by nature, be basically unhappy with things as they are, whether chemical systems or his job.

In general, the researcher who hankers to be a bigger fish in a smaller pond may expect from his employer a hearing, possibly minor adjustments (organization pyramids usually preclude any major pay raise or promotion), and—whether he leaves or stays—no predjudice because of his ambition.

Management, as a whole, seems reconciled to today's researcher recruiting practices. At least there's been no formal effort by the chemical industry to counter it. One reason may be that any "gentlemen's agreement" would be difficult to enforce. The aircraft industries reportedly tried such a plan, recently abandoned it. Member firms are now cautioned by the Aircraft Industries Assn. to set their own recruiting policies "in accordance with the highest ethical standards."

Whether such advice is needed in the chemical industry is moot. Competition for research talent is often highly zealous, but—despite the popularity of a handy term like "pirating"—few chemical companies are crying foul.

AGAIN... INGALLS BUILDS THE *RIGHT* BARGES FOR THE *SPECIAL* JOBS!

This anhydrous ammonia barge is the first of two being built by Ingalls for the Mid-South Chemical Corporation. The 210 x 44 x 13 foot barge has a 400,000 gallon capacity, and will carry liquid fertilizer in 81 foot cylindrical tanks from Texas and Louisiana to Memphis and St. Marks, Florida.

Each barge has six tanks, designed for a working pressure of 250 pounds per square inch. The barges are protected by air-operated safety valves. Each barge also meets all requirements of the American Bureau of Shipping and the United States Coast Guard for limited coastwise service.

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EVERETT AND MOBILE LABORATORY: For research-on-wheels, an enterprising spokesman.

Peripatetic Consultant Takes Lab to the Problem

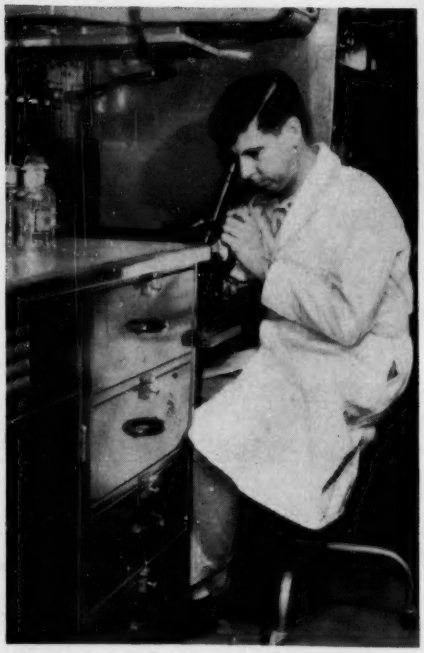
Young (33) Robert Everett recently plunked $25,000 into the mobile laboratory shown above, thereby becoming a novel figure in chemical consultant circles. His aim: to provide on-the-spot research and control facilities to firms without laboratories or technical staffs—particularly those companies whose problems are best attacked in their natural setting. In addition to his mobile setup, Everett maintains an Indianapolis office, works closely with other commercial laboratories in the area.

So far, he has helped absolve one chemical company of fault (its wares, used in aluminum molding, were suspected of causing stains); helped a heater and air conditioner maker find the right paint for its products; put new life in a small paint company by developing new products, improving old ones.

Along with research and development, Everett says, he will tackle problems in production and analysis—e.g., reducing rejects, cutting manufacturing costs, writing specifications, etc.

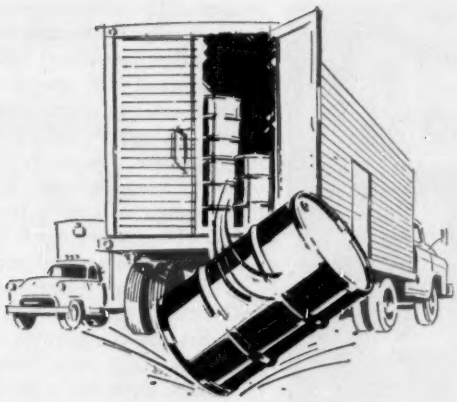
Hub of the enterprise is the lab-on-wheels, purchased from Fisher Scientific. (Mobile laboratories have been used for some years by large companies, trade associations.) Built on a bus chassis, it contains 36 ft. of laboratory furniture and cabinets, can be divided into two sections, so that tests conducted in each section will not interfere with each other. It includes a refrigerator and BOD incubator, can be used for water analyses, stream pollution studies, food testing, etc.

Completely self-contained, the lab houses electrical generators (total of 7,000-watts output); water tanks (plus a 25-gal. still for distilled water) and two tanks for LPG fuel.

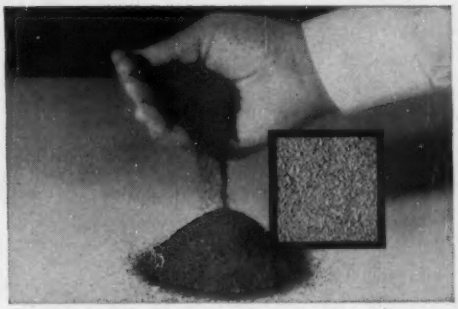


INTERIOR: Twin labs speed projects.

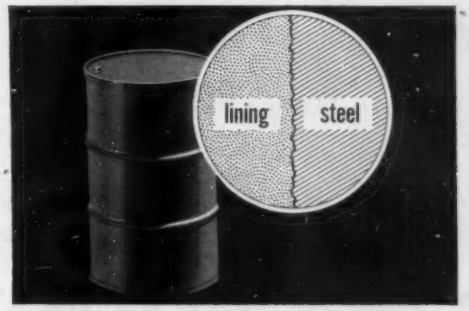
Rheem readies its steel drums for rough treatment 3 important ways



RHEEM **BLASTS** its drums under a hailstorm of high carbon steel chips. This physically cleans the surface, so protective linings and exterior coatings can get a lasting grip on roughened, naked steel—can stand up to miles of jarring blows and bounces.



RHEEM **BONDS** its drum linings directly to the steel. No scale or impurity is sandwiched between steel and lining to invite flaking or peeling, even under sudden temperature changes on the road. Rheem linings can't slip or slide . . . they're integrated!



RHEEM **BAKES** its drums in a *stand-up* oven for more even baking. Their tops and bottoms have a separate oven. It's fussy detail, but curing is a critical step in applying linings that *last*, and 2-oven baking does just that.

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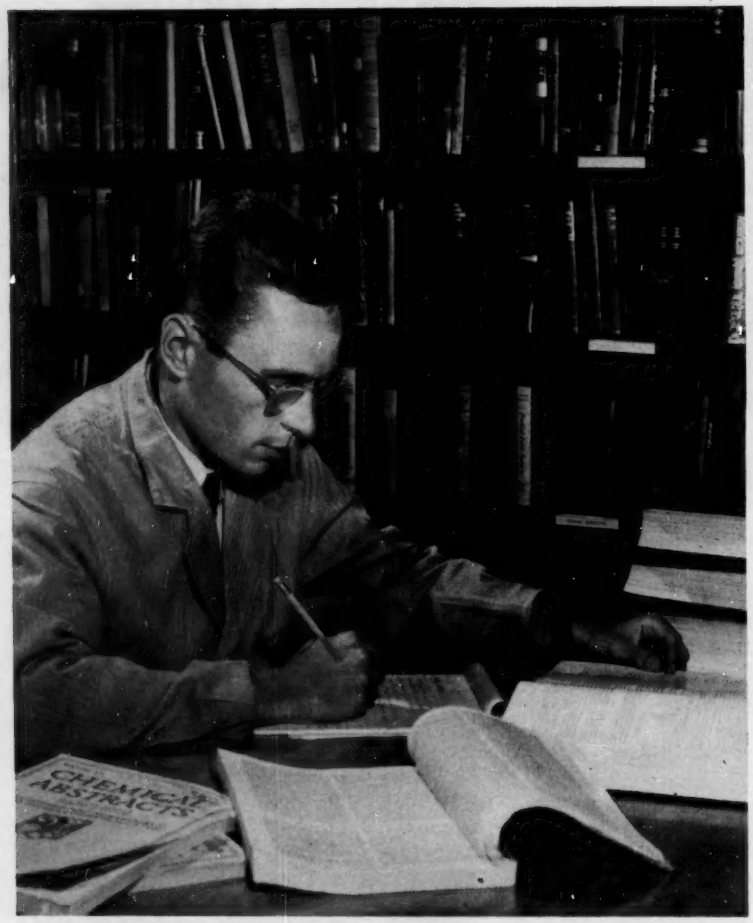


DOCUMENTATION CHEMIST: Research managers ponder if he should be . . .

New Member of the Team

The team approach for attacking and solving scientific problems is no novelty. But laboratory men are now finding that a newcomer is making an appearance on their squads. His title: documentation (or literature) scientist. Duties: to gather, evaluate, process and disseminate scientific information to the team. Properly utilized, he can save up to 25% of the laboratory man's research time—time now spent in library labors.

Smith, Kline & French Laboratories (Philadelphia) and Charles Pfizer and Co. (Brooklyn, N. Y.) are two firms in this country that have placed literature specialists on the research team. In Europe, too, this practice has its adherents.

Where He Fits: According to Robert Tucker, SKF senior research scientist, a team developing a new antispasmodic drug would include a documentation scientist working with an organic chemist, a biochemist, two pharmacologists, a gastroenterologist, and a pharmacist.

Pfizer has used the plan on several occasions. For instance, a documentation scientist played an important role in an antibiotic research study that involved a problem of complex molecular structure.

What He Is: Tucker states that the documentation scientist should have as broad a scientific training and background as possible. Preferably he is versed in several fields of science, covering and related to the one in which he is working.

In addition, he should have: an advanced degree (preferably a Ph.D.) in chemical or biological science; laboratory experience; training in literature work; a flair for writing. Also, he must get along well with other scientists, be adept at securing cooperation between individuals both on and off the project team; always have the broad aspects of the problem in mind; at the same time, become sufficiently familiar with details of the laboratory to advise, coordinate, facilitate operations.

Naturally, a person with such qualifications is not easy to find. But SKF has put considerable effort into locating suitable men, feels that, in this endeavor, it has a good start on the great majority of other companies.

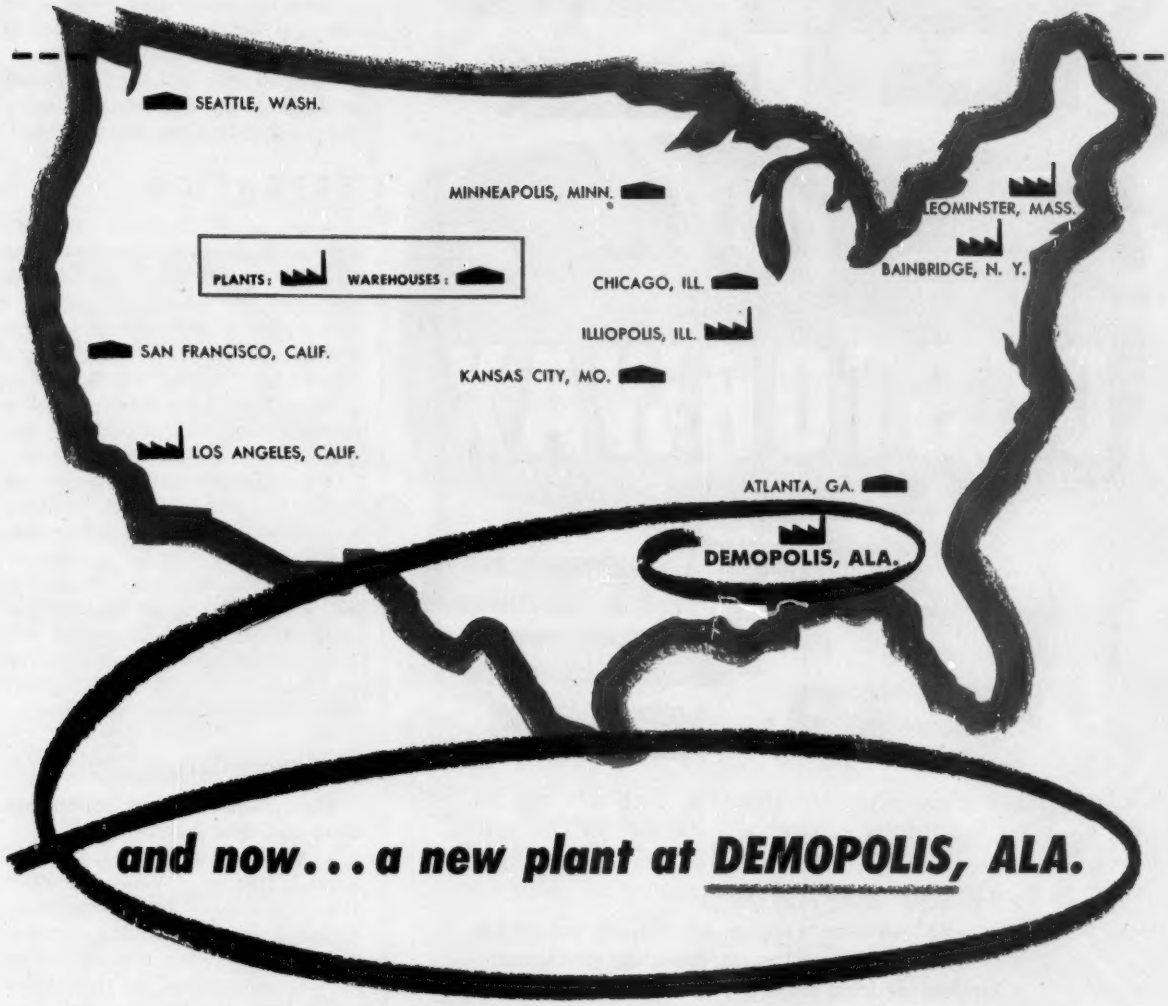
What He Does: According to Tucker, the documentation scientist has no difficulty keeping busy. Among his many contributions, he should:

- Keep abreast of current literature.
- Attend meetings to discuss research, acquire new ideas from other scientists.
- Establish relations with other institutions to secure first-hand information via telephone, letters, personal visits.
- Perform liaison work that is scientific and nonadministrative between team members; he also does liaison work with outside staffers; contacts members personally to check on the team's progress, and takes action to overcome bottlenecks.
- Supply new ideas. Because of his unique position in maintaining close watch on the literature and because of his numerous outside associations, he's in a good spot to do just that.
- Prepare review of the literature. In lieu of reviews, he makes annotated bibliographies.
- Issue progress reports periodically.

Question for Dispute: Whether or not the documentation scientist will become a permanent fixture on research teams is a matter for dispute. Many firms that like the idea in principle shy away because of the difficulty in finding the right man.

Bell Laboratories is now considering the idea. But it is hesitant about stultifying creativity by making one man the idea man of the team. Research administrators there point out that any member is likely to come across new ideas by walking through the labs, talking with others. They also feel that possibly one man would

nobody but *Borden* gives polymer and copolymer service like this!



To keep pace with the industrial growth of the South, particularly the paint, paper and textile industries, Borden's Chemical Division is once more expanding its facilities for vinyl polymer and copolymer emulsions and solutions with a new plant at Demopolis, Ala. This installation will supply top quality polyvinyl acetates, polyvinyl alcohols, butadiene styrenes, acrylic solutions and emulsions, sodium and potassium polyacrylates, and vinyl chloride copolymers.

Just like all Borden's Chemical plants across the nation, this new Demopolis installation will provide the outstanding service that Borden customers depend on. Polymers and copolymers "tailored" to your needs. Prompt delivery in tank cars, tank trucks, or drums. And a staff of highly skilled technical men ready to help solve your problems. For more data on Borden's polymer and copolymer service, write The Borden Company, Chemical Division, Polyco-Monomer Dept. CW-96, 350 Madison Ave., New York 17, New York. In Canada: Polyresins, Ltd., 184 Laird Drive, Toronto 17 (Leaside), Ontario.

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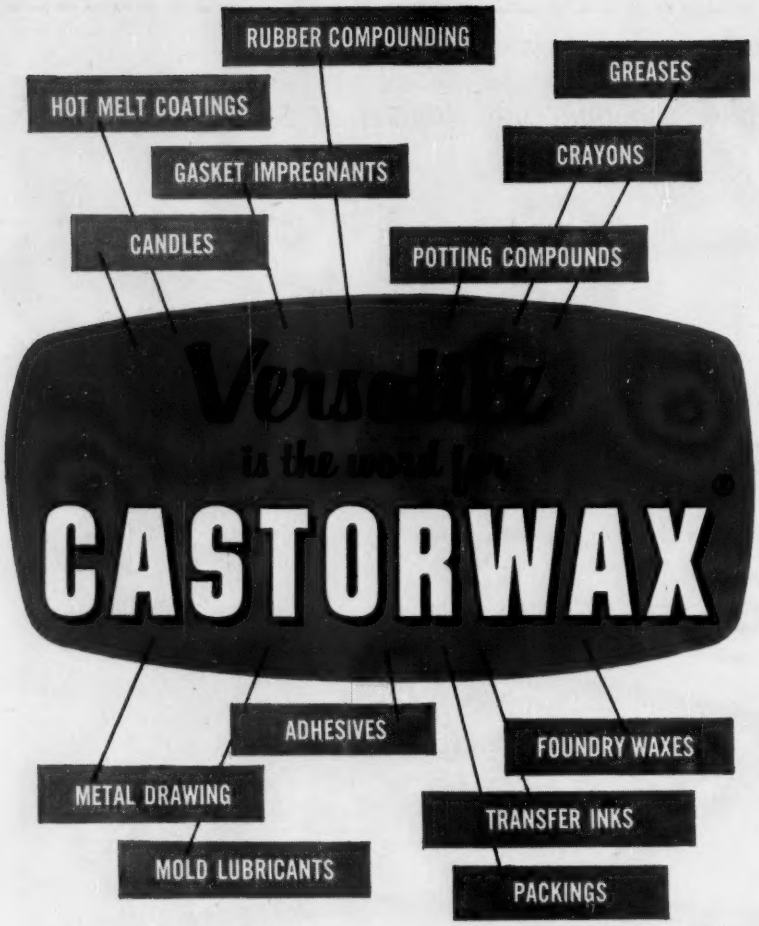

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not be able to provide as many genuinely new ideas. In short, they think that many heads are really a lot better than one.

Some companies have looked at the idea, but feel that it simply doesn't fit in with their organizational setups.

They all agree that the man Tucker envisions as the documentation scientist ought to be a star on any team.

EXPANSION

• Goodyear Tire and Rubber's (Akron, O.) chemical division has put its new $80,000 rubber development laboratory into service.

• Under a new Atomic Energy Commission permit, Aerojet-General Nucleonics (Walnut Creek, Calif.) plans to build a low-powered nuclear research reactor to be located in San Ramon, Contra Costa County, Calif.

• Radiation laboratories are planned by Du Pont ($2-million facility at the experimental station in Wilmington, Del.); G. D. Searle & Co. (Chicago)—for radioactive tracer medical research; and Southwest Research Institute (San Antonio, Tex.). The last-named will cost $600,000, will be built for Pratt and Whitney as part of that firm's nuclear-powered aircraft program.

German Drug Gains?

These German patent applications cover new drug developments:

• According to F 8,255, to Farbwerke Hoechst AG. (Frankfurt Hoechst), mercurization of aromatic allylamides leads to excellent diuretics. They have a lower alkalinity than known compounds of this type, which makes them less irritating and obviates the need for buffering.

• Streptomycin hydrazones exhibit stronger and more prolonged activity against tuberculosis than streptomycin and are well tolerated, according to application C 6064, to Chemie Gruenenthal GmbH. (Stolberg).

• F 7910, to Farbenfabriken Bayer AG. (Leverkusen), reveals that reactions of certain diisocyanates with ethylene imine lead to new alkylene ureas that reportedly inhibit certain cancers and possess low toxicity.

• Nordmark Werke's (Hamburg) application N 4827 claims protracted analgesic action by aromatic amino compounds. The best: N-methyl-*bis*-(β-benzyloxyethyl)-amine.

• Direct production of desoxycorti-

costerone acetate from progesterone is covered in F 7227, to Farbwerke Hoechst AG. According to the application, 3,20-diketones of the cyclopentanopolyhydrophenanthene series, such as progesterone and its derivatives, can be converted by a direct route into 21-acyloxy compounds, such as desoxycorticosterone acetate and others, by condensation with oxalic acid.

Handy Battery

PRACTICALLY unlimited shelf-life is claimed for this new low-current, solid electrolyte battery developed by National Carbon Co., division of Union Carbide and Carbon Corp. Made primarily of silver, silver iodide and vanadium pentoxide, the quarter-ounce cell can withstand –70 to 170 F with no appreciable change in voltage.

Its theoretically infinite life (when not in use) derives from its completely dry construction and operation. The battery uses no liquids, gases or vapors, nor does it form any of these when in operation. Now in pilot-plant production, the battery caps three years of research by National Carbon, will be developed further at the division's new solid-state research laboratories at Parma, O.

The man with a nose for profit!

At first, when he started sniffing the air, we thought this manufacturer had detected an off odor in our product.

"No, no, it isn't that," he said when we expressed our puzzlement. "I smell something here, though. You say ACINTOL® FA Fatty Acids are based on a non-fluctuating raw material source?" We affirmed. "And the price is stable. And quite reasonable, I think you said?" We couldn't contradict him.

He sniffed again. "Highly fractionated products, too, what? Low rosin and unsaponifiables? Good color, color stability, and all that? High linoleic acid content—no linolenic? Good odor, too, obviously."

We concurred. "Smell something, though," he said. "Maybe it's money."

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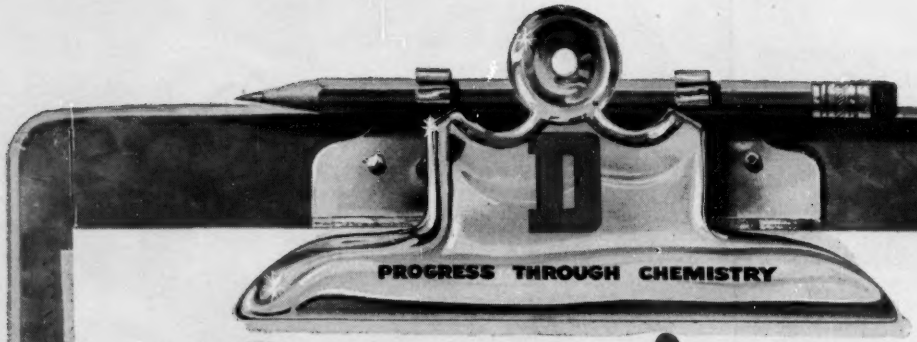

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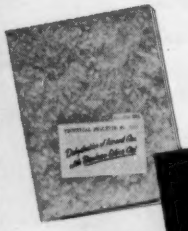

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Technology
Newsletter

CHEMICAL WEEK
September 8, 1956

There's still no word from Dow Chemical on the precise makeup of its new synthetic fiber, Zefran (*CW, Aug. 18, p. 29*). But you can bet on this: the "dye receptive" structure is vinyl pyrrolidone.

Dow has described Zefran as a nitrile alloy. This would indicate that it's a polyblend, possibly of a copolymer of acrylonitrile and vinyl pyrrolidone with polyvinyl pyrrolidone. But textile people are not ruling out the possibility that it's a terpolymer of acrylonitrile, PVP and a third compound, methyl acrylate, for instance. (Cyanamid's Creslan is believed to be a terpolymer of acrylonitrile, vinyl pyridine and methyl acrylate.)

General Aniline & Film will say only that it has worked with several fiber companies and, for obvious reasons, can't talk about it. But PVP will make up a large portion of Zefran—possibly 18-20%. For a 12-million-lb. staple plant, that would mean a requirement of more than 2 million lbs. of vinyl pyrrolidone. And GAF is the only commercial supplier in this country.

Pyrrolidone and vinyl pyrrolidone have long been touted as potentially attractive components of synthetic fibers. Arnold, Hoffman has done a considerable amount of work on homopolymers made from pyrrolidone. It has showed that it's possible to make a material broadly resembling Perlon by polymerizing pyrrolidone (U.S. patent 2,638,463).

GAF itself has investigated the field of copolymerizing vinyl pyrrolidone with other molecules, including acrylonitrile. It found that polymerization proceeded over a wide range of conditions. Water solubility of the product tends to increase with the amount of vinyl pyrrolidone added. But it found that water-soluble polymers could be made insoluble by heating.

The big plus for pyrrolidone in fibers is that it does wonders for the dyeability. Most of the firms with fiber interests have considered it. Chemstrand, for one, found that small amounts of vinyl pyrrolidone in an acrylic improved hand and dyeability (U.S. patent 2,643,990).

But making a fiber is a very tricky business; there are many variables to be considered. In the case of vinyl pyrrolidone, molecular weight is highly important, as is the means employed for getting it into the fiber structure.

•

American Gilsonite has slightly altered its plans for pumping gilsonite slurry from Bonanza, Utah, 70 miles to its processing operations near Grand Junction, Colo.

As originally conceived, the pipe would have crossed the White River and Evacuation Wash in one span. Now the plan is to cross the White River in one 700-ft. span, then lay another 600-ft. span (a mile further east) across Evacuation Wash.

•

Expenditures for the National Research Council of Canada in 1955-56 will, Canadian government sources say, reach $16,077,844. $15,700,525 was spent in 1954-55.

Technology Newsletter

(Continued)

A heavy-water-moderated, sodium-cooled reactor using slightly enriched uranium as fuel will get its first large-scale test in a 10,000-kw. reactor at Anchorage, Alaska. The Atomic Energy Commission approved limited initial design and development work on such a reactor proposed by the Chugach Electric Assn. of Anchorage.

Lots of work has been done on both heavy-water-moderated and sodium-cooled reactors, of course. Nevertheless, AEC foresees some pretty knotty technological problems that will have to be solved before the two can be joined in a single reactor.

But AEC points out that Alaska is a high-cost power area in which nuclear power could become competitive sooner than in low-cost regions.

•

A giant technological step forward in steel processing may recently have been taken by British chemical engineers. They've made a form of steel directly from iron ore. The work is strictly experimental now, but it's sure to create a stir among processing firms here.

There has been considerable interest in this country in direct reduction of iron ore with hydrogen. Hydrocarbon Research and Bethlehem Steel have been cooperating on a semicommercial project involving a fluidized reduction. Dorr-Oliver has been exploring the same general field (*CW Technology Newsletter, March 31*). Other steel companies are known to have active projects along similar lines.

But the British are going one step further. At a meeting of the British Society for the Advancement of Science, Sir Charles Goodeve, director of the British Iron and Steel Research Assn., outlined a process that goes like this:

Iron ore is reduced, then fed into a bed of powdered coal and oxygen. The product is described as a "recognizable form of steel" tagged Cyclosteel.

Experimental runs have proved highly satisfactory, says Goodeve. But the process entails temperatures of around 1600 C. And the problem of building commercial equipment for such a process would be staggering. Although little has been published on the subject, similar work is believed to be going forward in Germany.

•

Dole Hawaiian Pineapple will make bromelin available in limited commercial quantities. An enzyme found in pineapple, bromelin can be precipitated from the juice by alcohol or ammonium sulfate. The chemical is now used in breweries; Dole foresees other industrial applications for it.

•

A fluorinated silicone is being revealed this week by Dow Corning and the Air Research Development Command. According to the Air Force, it resists swelling in contact with aircraft fuel, hydraulic fluids and petroleum-base engine lubricants. It was described at a meeting of the Society of Automotive Engineers in Dayton.

Using titration apparatus, technician checks acid value of UNITOL ROS.

UNITOL ROS is consistently pale in color. Typically lighter than color standard "X"

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In chemical and physical characteristics, *UNITOL ROS* compares favorably with gum and wood rosin. Typical analyses show a color paler than "X" and a softening point (Ring and Ball) of 85° C.

These factors, coupled with the competitive advantage of lower price, indicate that *UNITOL ROS* should have a valuable place in your manufacturing operation.

Write for samples and additional information.

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Editor in the Air . . .

SID KIRKPATRICK *started his 36th year with McGraw-Hill chemical publications in June, 1956. Usually, you'll find him in a chemical plant or front office, rarely in a relaxed moment like this.*

with both feet on the ground!

Just keeping up with Sid Kirkpatrick would have anyone on the fly. For Sid—"if anyone calls me Sidney, it's my cue to duck"—is something more than Editorial Director of two of McGraw-Hill's most dynamic magazines. A long-time member of the "have tux will travel" school, he is a familiar and respected figure in chemical plants and their front offices throughout the United States.

From his unique vantage point, Sid is able to maintain a constant bird's-eye view of the editorial direction of CHEMICAL ENGINEERING and CHEMICAL WEEK, and of the giant chemical process industries they serve. It is this same broad view that enables him to look at both sides of every significant story. He works closely with the editor of CHEMICAL WEEK, who interprets the important business news for management men—and the editor of CHEMICAL ENGINEERING, who reverses the field to give engineering know-how and economics to technical men. In between, Sid, who is also a Vice President of the McGraw-Hill Book Company, has sandwiched almost 30 years' service as Consulting Editor for its Chemical Engineering Series of texts and reference books. Of them he says, "We built a profession by building a permanent foundation of literature beneath it."

Sid has piled up an impressive list of other achievements, too. He "picked enemy brains" behind the German lines before V-E Day as a member of the Technical Industrial Intelligence Corps. Later, he served with the National Commission on the Disarmament of Japan. This was history repeating itself, for Sid was associated with the American Commission to Negotiate Peace at Versailles after World War I, where he helped draft the technical portions of the treaty dealing with coal tar chemicals and dyes. (In his typical self-effacing manner, Sid says he was just an errand-runner for Bernard Baruch.)

Today, Sid still serves the government. He is Chairman of the Advisory Committee on Industrial Information, U. S. Atomic Energy Commission. As a consultant to the Army Chemical Corps, he was also a member of the accredited scientific observer staff at Bikini for "Operation Crossroads".

Some of the other highlights coloring Sid's career include Member, Director and Past President of both American Institute of Chemical Engineers and the Electrochemical Society. In 1952, the American Institute of Chemists summed up Sid's many activities when he was made an Honorary Member. The citation read: "Sidney D. Kirkpatrick, outstanding editor, who by taking strong stands where needed for the good of the profession, promoting the Chemical Engineering Achievement Award, taking active leadership in professional societies, and encouraging younger men by speaking and guiding junior groups and individuals, has contributed to the profession . . . of chemical engineering far beyond the normal call of duty."

Experience like his is typical of many McGraw-Hill editors. Their detailed knowledge makes them specialists with feet-on-the-ground awareness—both literally and figuratively. They live with the problems of the men in the fields they serve and provide them with accurate reporting and helpful business information.

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More than a million men in business and industry pay to read McGraw-Hill business publications

COST VS. CONVENIENCE: Methyl bromide (left) is cheaper, but water-soluble types (right) are more easily applied.

Fumigant Makers Tap the Soil Bank

You'd hardly think that soil that won't grow anything—that even kills plants, wipes out insects, nematodes and fungus—would ever play an important part in the farmer's scheme of things. Fact is, however, that soil treated with chemicals that kill virtually all living matter is becoming increasingly important in agriculture, and need for chemicals to do the job is on the rise. Right now, sales are estimated to be in the $6-million/year range.

Fortunately for farmers, the use of chemical soil sterilants (or fumigants) results in soil that is only temporarily inhospitable to plants—after two to three weeks, when the soil has been cleared of troublesome weeds, fungi and other pests, it is once again suitable for crop-raising.

Currently, greenhouse men and other high-profit-per-acre growers are top users of the sterilants. But with the chemicals packaged and formulated for simplified application, distributors will be aiming for the home gardener.

Item: Stauffer Chemical Co. plans to package and test-market a quart size of its new fumigant, Vapam. Already, on the West Coast, jobbers are selling gallon jugs of it (*see cut*).

Right now, makers of soil sterilants are readying for what could well be their biggest season. Fall, when the crops are in and the soil is warm enough to provide good vaporizing conditions, is the best time to use the compounds.

Added Competition: This fall the product earmarked for the big promotional push is Vapam (chemically, sodium n-methyl dithiocarbamate dihydrate). Stauffer Chemical pioneered the novel material, and got it into national distribution last October. Now, Du Pont has licensed the product and is selling it (*CW, July 14, p. 86*).

Long the tightly held domain of ethyl dibromide and methyl bromide, soil sterilization may get a boost from easy-to-apply Vapam. As things stand now, its sales volume is far below EDB and MB, but one firm estimates sales will be 3 million gal./year shortly. Vapam's handicap: high cost compared with others.

There are, of course, many other soil-treating chemicals. Because of their broad range of pesticidal ability—they kill off fungus, soil insects, nematodes and the like—EDB, methyl bromide, and Vapam are arbitrarily grouped together. Certainly, such widely used chemicals as Shell's DD, Nemagon and dieldrin do a vital job for the farmer when used on the soil. And nemacides, like Virginia-Carolina's VC-13, and Carbide's Crag (mylone), have been demonstrating their worth in killing several types of soil pests. Nonetheless, these products don't have the sweeping killing power or the following of EDB, methyl bromide or Vapam.

Sales Point—Simplicity: Probably the most important feature of the new Vapam is its simplicity of use. It's water-soluble, and can be mixed in water for direct spray application or applied with a hose proportioner. No injecting equiment, plastic covers or similar equipment is needed.

Because Vapam is easy to use, Stauffer figures the home gardener will take to it readily. But Vapam won't be the only soil fumigant sold in small quantity for gardeners' use. Dow Chemical has been selling gallon cans of its EDB (83% active ingredient in naphtha) through garden shops.* It can be poured from a fruit jar into furrows in the fields to be treated, then covered. Should gallon cans be more than the gardener wants, Chemical Research, Inc. (Detroit), offers EDB in small gelatine capsules (*CW, Nov. 26, p. 104*).

So far, Dow reports sales to gardeners have not been encouraging, but it won't give precise figures.

*Other suppliers of ethylene dibromide include Food Machinery and Chemical Corp., and American Potash & Chemical Corp.

Undercover Stuff: Methyl bromide is likely second largest-selling soil fumigant. A gas, it must be applied to soil that is covered by a plastic tarpaulin (*see cut*) for about 24 hours after the bromide application.

Once they're in the soil, the fumigants act pretty much the same. All work best in moist soil—with EDB and methyl bromide, it helps insure penetration of the fumigant, and with Vapam, the moisture has the extra job of "sealing" the gas in the soil so that it can do its work. (It's advisable to sprinkle soil treated with Vapam for up to one week.) After about one week, the soil is cultivated and loosened, so that residual gas escapes. Then, within two to three weeks, the soil is ready for planting.

Carbamate Specialists: The brominated fumigants, chemicals that have been commercial for years, are not as costly nor as complicated to make as is Vapam. It's logical that Du Pont, with considerable background in the manufacture of carbamate herbicides, should seek to get into the manufacture of the carbamate Vapam.

Currently, Stauffer is turning out its fumigant in a full-scale plant in Richmond, Calif., and a semiworks plant in Chauncey, N.Y. Du Pont won't say where it is making its material (if it has gone into production at all), nor if it intends to build a manufacturing facility.

As it's made in the Stauffer plants, Vapam is a yellowish water solution, containing about 4 lbs. of active ingredient/gal. of water. A purple dye is added by Stauffer—whether Du Pont will add a similar colorant has not been revealed. Present production of the chemical is said to be "several thousand gallons/day."

Dry forms of Vapam probably could be produced. But the one advantage seems to be that it could be readily mixed with dry fertilizers, and this must be balanced against the cost of the drying operation.

None Cheap: Cost of the various fumigants varies considerably. Gallon jugs of Vapam cost the gardener about $5.60; larger containers, and quantity-buying reduce the cost to $3.20/gal. Methyl bromide, a gas, costs about 50¢ lb. EDB in naphtha solvent sells for $2.50/gal. For a 41% active material, or about $6/gal. for an 83% active material (which has roughly 12 lbs./gal. EDB). But it's not in gallonage prices that the difference in the products comes out.

A farmer can kill off most soil pests with EDB for about $35/acre; a similar job with Vapam would run about $150. This is for chemical costs, and doesn't include the equipment nor labor. Where more Vapam must be used (to insure all weed seedlings are killed), the costs are higher. Stauffer and Du Pont plainly count on ease of use (plus some other features) to do much of their selling job.

In greenhouse applications, where Vapam competes as much with steam sterilization as with other chemicals, the new compound has proved to be very popular. It appears that differences in cost, applications and uses will leave each chemical sterilant with its own portion of the market, and the over-all picture is for a greatly expanded total market for fumigants.

OVER THE COUNTER: Simplicity of use brings the gardener into the picture.

Colorful Selling

Backed by a combination of sensational advertising, progressive sales methods, and some hard, dealer-level plugging, Koton acrylic paints, made by Embree Mfg. Co. (Elizabeth, N.J.) have entered the "big money" market. Though the firm's ad claims make paint-vehicle suppliers shudder, cause other paint manufacturers to turn livid in irritation, the campaign has boosted the 30-year-old firm into $500,000/year sales bracket—it's the first time the company has found itself crossing the half-million mark.

As retailed by several firms, acrylic paints for exterior uses have been steadily winning customers since their introduction about three years ago. They appeal to householders because they are quick-drying, almost odorless, retain original color tones and are water-resistant. What's more, they are easy to apply. Although fairly expensive to manufacture, the paints have been marketed by several paint manufacturers.

But Embree, with its premium prices ($8-9/gal., compared with conventional house paints in the $5-6/gal. range) has cleverly capitalized on these features. Its free-wheeling ads stress "all weather" application, "10-minute" drying time, freedom from lap marks. The need for carefully priming surfaces and doing other required prepainting chores (e.g., sealing wood) are undertoned.

Although other manufacturers may frown on these promotion techniques, Koton paints, after three years of sales, have taken a good share of the

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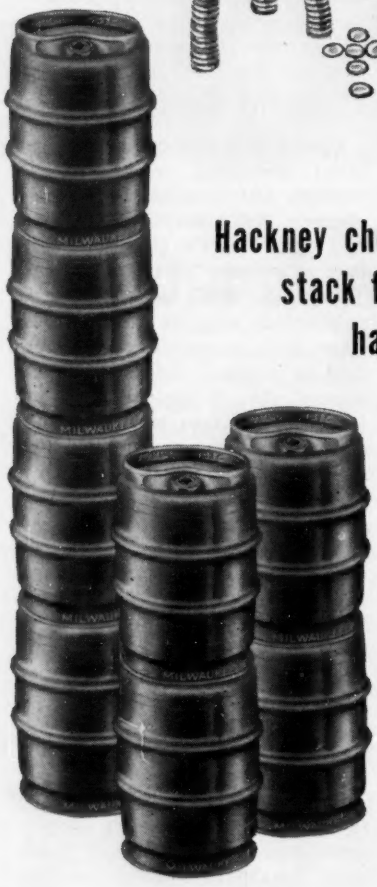
Hackney chemical containers stack four high...save shipping, handling and storage costs



Here's the lightweight, stainless steel acid container that builds a safe, compact stack — saves warehouse space and handling time for you. Bottom foot ring of the 15½-gallon Hackney chemical container fits snugly over top ring of lower barrel.

Designed with easy-to-grasp, full curled foot rings for safe, one-man handling and convenient pouring. Your name can be embossed on the bottom ring. Low tare weight reduces transportation costs. Stainless steel protects your dangerous or corrosive chemical products — eliminates breakage losses.

These 15½-gallon containers are just one of the many types and sizes of returnable shipping containers that bear the famous Hackney name. Write today for the complete Hackney Drum and Barrel Catalog.

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Hackney

DOWNINGTOWN IRON WORKS

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

exterior-acrylic market. Distribution is to more than 140 hardware and department stores. New areas are constantly being added. This spring, Koton paints went on sale in Detroit, are reported to be doing "exceptionally" well.

It's taken three years, but it looks as if Embree Mfg. Co. has found a way to reach the consumer's pocketbook with acrylics for exterior use. It remains to be seen whether other paint manufacturers follow Embree's flamboyant path to profits.

Tubed Coating

American-Marietta has come up with a brand-new gimmick to sell its jel-type, thixotropic alkyd paints. A-M is packaging the paints in collapsible tubes—7½-oz. size, enough for about 40 sq. ft., sells for 95¢; 3¾-oz. size, for about 20 sq. ft., sells for 50¢. The paint is applied conventionally with brushes.

Although paint pigments and artists' oils have long been packaged in tubes, it has taken the development of the thixotropic alkyd to make feasible the packing of ready-to-use interior paints in tubes. The danger of spillage is reduced, and the paint stays thoroughly mixed. A-M has applied for a patent on the tubed paints.

Coating With a Kick

The Jones-Blair Paint Co. (Dallas, Tex.) is now marketing "Satin-X with APR," a vinyl latex interior wall paint with a germ-killing additive called APR (antipathogenic reagent). This additive is claimed to react with paint compounds during the formation of the film of the paint to produce the germ-killing surface. According to the manufacturer, APR kills germs on contact for as long as two years after application, and repeated washing and scrubbing does not lessen this property.

The new Jones-Blair paint with APR is made under license from Denton-Edwards, Ltd. (Barking-Essex). Called the "Dentolite process," the manufacturing method has been in use in England for several years. Jones-Blair is the first company in the U.S. to utilize the process, and is now supplying its dealers in Texas, Oklahoma, Louisiana and New Mexico with its fortified paint. Available in 16 standard colors, it retails for about $6/gal.

A Cappella.....

Quality is a popular song proudly sung, sometimes fortissimo, sometimes pianissimo . . . but sung so often the words almost lose their meaning.

With your kind indulgence, we would like to offer our rendition A Cappella . . . no cymbals, no blaring brass, but with meaning.

Quality in Formaldehyde and Hexamine means a lot to *you* and *your* finished plastic resin products. MERCK Formaldehyde and Hexamine are made to the most rigid industry specifications . . . for instance: impurities of heavy metals 0.0001%, maximum iron content 0.00004%. (Formaldehyde 37% Solution.)

Ask your control chemists to check our quality, or write to Department FH-3, MERCK & CO., Inc., Rahway, N. J. We'll be glad to discuss your requirements.

VALKO AND TESORO: They quell static electricity with conducting polymer.

Two Against Fiber Static

If Onyx Oil & Chemical Co. (Jersey City, N.J.) has anything to say about it, textile men will find that there is a lot more than dyestuffs to talk about this week—the week of the Perkin Centennial celebration. Onyx has just launched its permanent antistatic textile finish, Aston LT*, and looks for it to be a real jolt to the trade.

Developed by Emery Valko, Onyx's vice-president in charge of research, and his assistant, Giuliana Tesoro†, the new finish is specifically designed to whip the static-electricity problem that has hobbled the synthetic fiber industry. Aston LT has a combination of properties that Valko says can't be matched by any other finish—and, so far, no other firm has made anything like the far-reaching claims of Onyx. The new treatment, Onyx avers, offers these pluses:

- True permanency. Fabrics processed with Aston LT will, the firm says, retain their antistatic properties throughout a garment's lifetime. Antistatic properties of the finish reportedly are not impaired by dry cleaning, or by washing in either soap or synthetic detergents. Low resistance to soap is the weakness of at least one permanent antistatic finish.
- The finish, it's claimed, can be applied effectively to all commercially available fibers, as well as to those not-yet-commercial synthetics that have been available for testing. Suitability for only a few fibers has limited the market for other long-lasting antistatic agents.
- Hand of treated garments is claimed to be unaffected; and tensile strength allegedly isn't reduced. By dissipating the static charges, the "comfort factor" of synthetic fiber garments is raised.
- No special equipment is required for the treatment.
- Cost of the treatment is said to be in line with others currently available. (Onyx isn't publishing gallonage prices of the chemicals right now.)
- In lab tests, Aston LT processing is said not to interfere with other treatments that might be given the cloth.

Pleased as it is with Aston LT, Onyx admits the treatment has some shortcomings. In treated fabrics, reflectance is somewhat reduced—perfect white cannot be achieved. Where yellowing is to be avoided, concentration of the chemicals is reduced with a consequent sacrifice of the treatment's durability. Chlorine bleaches shouldn't be used on treated fibers, will impair the finish.

Conducting Jacket: Though Onyx readily tells what Aston LT does, it won't hint about its chemical composition. It says only that the treatment provides the fibers with a polymer jacket that helps maintain an invisible moisture-absorptive film on the cloth.

Treating agents are two chemicals—a clear solution of resin and a liquid curing agent. In solution (20% solids as currently prepared), the resin is treated with the curing agent just before use (about 3 oz./gal. resin). Application is made to cloth in standard resin-treating equipment at standard resin-treating temperatures (210-350 F, for 2-to-15 minute periods).

Depending on properties sought, the resin boosts cloth weight by ½-3%.

Synthetic Handicap: The versatility and expanding use of synthetic fibers have made almost everyone familiar with their static problems. These range from the inconvenience of clinging, clammy fabrics, to the mill problems with fibers that expand into machine-jamming masses. To both mill operator and consumer, the dirt-catching property of synthetics is a serious drawback.

The textile chemical industry has been researching antistatic agents ever since the synthetics became important commercial products. For the most part, mill problems have been countered with short-life chemicals or with elaborate mechanical devices to dissipate the static charges. Consumers may add an antistatic agent to the rinse water (like many chemicals used in mills, these are based largely on cationic materials).

Within the past few years, durable antistatics have been introduced by Du Pont and by Carbide and Carbon Chemicals (division of Union Carbide and Carbon Corp.). Far and away the best of the heretofore available materials, these products have certain limitations that their makers readily admit.

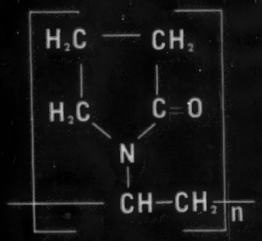
All told, there are some 80 or more chemicals offered as antistatics. (The chemical industry produced some 379.3 million lbs. of noncellulosic synthetic fibers last year.) Depending on use, and on cost factors, there will always be need for short-term antistatic agents as well as for the longer-lasting types. But it's a sure bet that Onyx's latest product will initiate a raft of research on permanent antistatic finishes.

*Name is derived from Anti-Static Onyx for Life Time.

†Valko and Tesoro share credit with textile chemists Paul Jacobs and Morton Schlesinger, polymer chemists Ed Szubin and Martin Lindemann, as well as Lucia Twombly, Carl Of, Patricia Lambert, and pilot-plant men Eric Stempler and Paul Linden.

PVP

(polyvinylpyrrolidone)



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APPLICATIONS

Cosmetic Industry

PVP in Hair Preparations—forms smooth, lustrous, hygroscopic film that results in better hair management. Many aerosol hair sprays, lotions and hair dyes are based on PVP.

PVP in Skin Preparations—detoxifies toxins and irritants, leaves protective film on skin, stabilizes lathers. Now used in shaving creams, cleansing creams, lotions, deodorants and nail polish removers.

PVP in Cleansing Products—acts as a foam stabilizer, prevents soil redeposition and improves hair management in shampoos. Is a foam-builder and protective colloid in toothpastes. Improves emollient and detergent action in waterless cleansers.

Pharmaceutical Industry

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Road to Rubber Markets

The recent highway bill signed by President Eisenhower authorizing $2.5 billion/year for road construction (CW, July 14, p. 22) may be the best news in a long time for the promoters of rubber and concrete combinations.

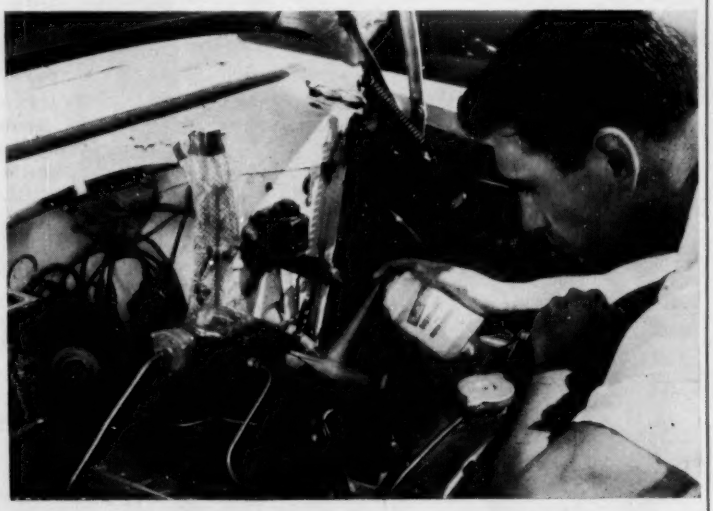
Several of such mixtures intended for bridge construction are now under tests by public road officials, and results so far have been most encouraging. This, with novel and simplified mixing and application techniques, promises to open up a market for rubber latex cement after a quarter-century of high promise but relative inactivity.

One new development in this field is Laticrete (*CW, June 4, '55 p. 103*), produced by Naugatuck Chemical Division of U.S. Rubber. This is a liquid-rubber and powder-cement product—packaged separately—which may be mixed in conventional mixers. Its limitation is the necessity of using the very fine powder cement instead of regular portland cement.

With an eye toward increasing use of natural rubber, the Natural Rubber Development Board* has come up with some new twists in the manufacture of rubberized concrete utilizing natural latex. The latest aid is a high-speed mixer that permits use of rubber latex in portland cement without the latex becoming coagulated by the cement. One device that has proved out well is the Colcrete Mixer marketed in the U.S. by Chemocem Co. (New York).

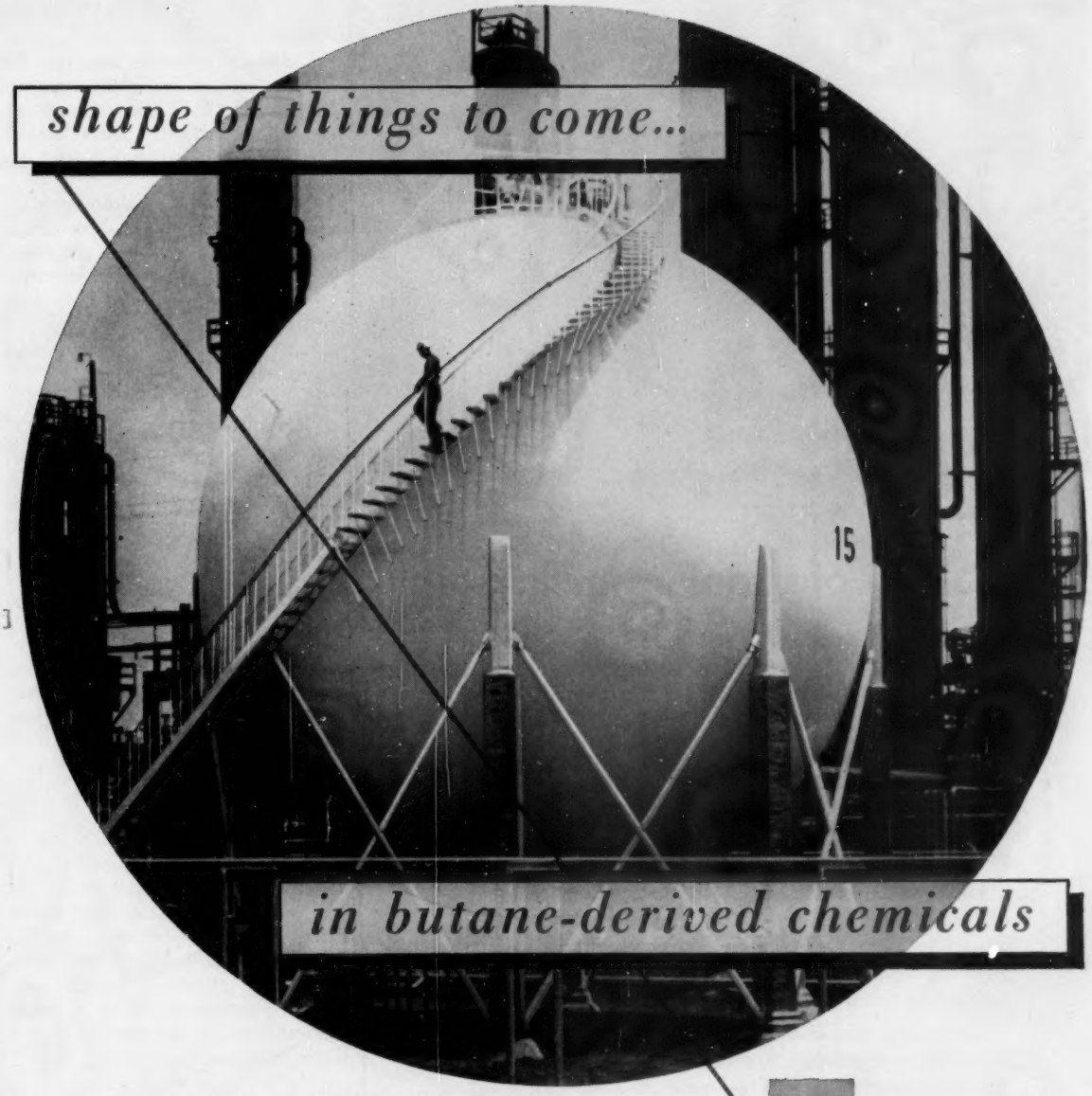
New uses for the resultant product are also being developed. Gun application to already-formed concrete structures has been perfected. The high velocity of contact with surface area insures maximum bond and ten-

*Formerly the British Rubber Development Board.



Subbing for Steam Cleaning

HANDY DEGREASER for household or automobile use is now being packaged in an aerosol container by Plasti-Kote, Inc. (Cleveland). A mixture of oil and grease solvents, the new aerosol, which retails for about $1.50, is simply sprayed onto the motor or machinery to be cleaned. Plasti-Kote calls it a simplified substitute for steam cleaning. A plastic bag may be used to protect motor parts—for example, the carburetor (*see cut*)—during the spraying.



Additions and betterments now being made at our Houston plant will increase capacity and add flexibility in end-product output. Soon we will produce substantially more butadiene and also offer the isomers n-butylene 1 and n-butylene 2.

Research done at this time can result in worthwhile commercial products now that an ample supply of raw materials at attractive prices will soon be available.

Petro-Tex will do everything possible to foster the development of products based on butane-derived chemicals. Discussion is invited.

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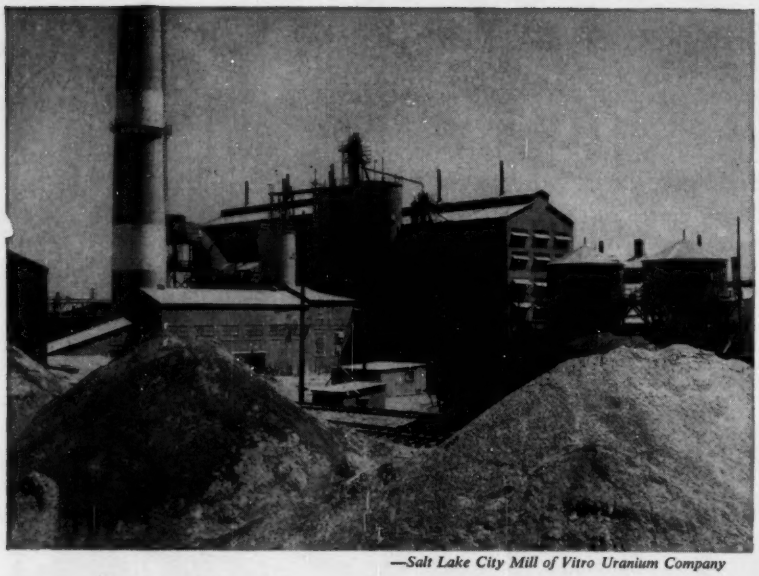

—Salt Lake City Mill of Vitro Uranium Company

speaking of uranium milling...

BIG THINGS are going on in uranium milling and refining on the Colorado Plateau. One of the newest is the use of solvent extraction to concentrate uranium salts from the various ores.

For the past year Vitro Uranium Company has operated a pilot plant to determine the merits of solvent extraction. Results were so successful that Vitro will expand its mill and install "SX" to supplement the standard acid leaching process, with a marked increase in efficiency.

Vitro's Salt Lake City mill, one of the largest independent custom mills in the industry, is also one of the best—thanks in part to Vitro Engineering Division, oldest nuclear engineering firm, which designed and installed many of its outstanding features.

Strategically located with respect to major ore areas, the Vitro mill carries a sufficient stockpile of uranium ores to insure a constant supply of raw material. It has substantial ore supply contracts with Atlas Corporation, Four Corners Uranium Corporation and other major miners.

Vitro is always interested in new ore sources and potential suppliers are invited to contact the company. Vitro also offers engineering and consultation to others who desire to build new mills or install new processes.

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SPECIALTIES

sile strength. Examples tested so far include use on sea walls, concrete groynes and effluent neutralizing tanks†. Noted: Latex concrete cement exposed to sea water actually increases in strength.

The ability of latex cement to adhere to a wide group of materials, such as steel, concrete, glass and wood, should increase its use in construction. This, plus new methods of application and continued experimentation with rubber and hydraulic cement, indicates a bright future for latex cement.

EXPANSION

Germ Killers: Heigate Products, Inc. (Toledo), has been formed to distribute disinfectants developed by Ottawa Chemical Co. First products include disinfectants for medical usage, deodorants for diapers and a skin preparation for fungus infections.

•

Texan Painters: Sherwin-Williams plans to expand and relocate its present Dallas plant. The new site, close to three important railroads, is slated to become S-W's major distribution center for paints and varnishes in the Southwest.

•

Patching Division: National Starch Products Inc. (Plainfield, N.J.) has acquired the Metlok Division of Sound Electronics, Inc. Metlok produces aluminum patches laminated to resin-impregnated fabrics. Typical use: providing permanent repair of metal surfaces, such as damaged truck and trailer bodies.

•

Home Base: Dettelback Insecticide Corp. has just completed new offices and a plant in Dallas to handle manufacturing and shipping of Dettelback products west of the Mississippi.

•

North of the Border: General Latex and Chemical Corp. (Cambridge, Mass.) will open its second Canadian plant for all phases of latex production. The new plant—chartered in Canada—is at Brampton, Ont.

•

Midwest Move: Solvent Service Inc. (Painesville, O.) has taken over the accounts of Lemont Chemical Co.

†Application to sea walls and groynes carried out in Great Britain; experimentation and application to roads (among others) in Malaya and Australia.

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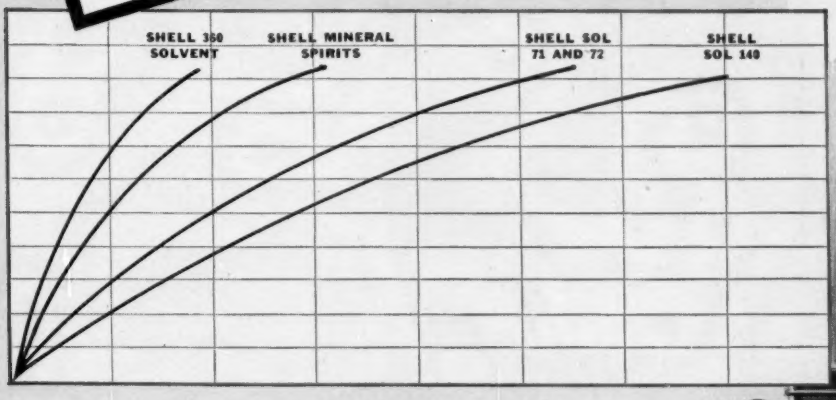

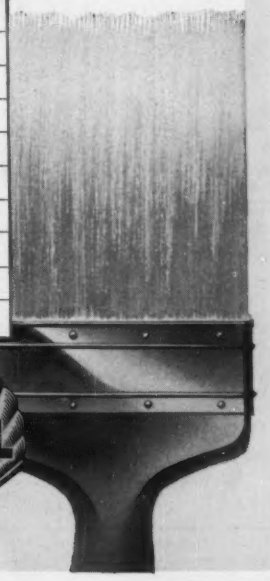

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(Lemont, Ill.). The firm specializes in chemical and hydraulic cleaning of industrial equipment. Solvent now serves accounts in South Dakota, Minnesota and several other Midwestern states.

•

Three to Go: Third section of Lea Manufacturing Co.'s (Waterbury, Conn.) new plant is now in operation. The firm, making surface finishing abrasive specialties, has added processing, packaging and storage areas.

•

Cave Canem: The Warner-Chilcott Laboratories, division of Warner-Lambert, has initiated plans to open a veterinary medicine unit this fall. It will merchandise several new drugs developed in W-C's research labs for the dog and cat trade.

NEW PRODUCTS

Brush On: CLV-300, a new liquid vinyl-base preparation produced by Eltee Co. (Burbank, Calif.), is now on the market. It is brush-applied and is claimed to leave a clear, tough, resilient film that deepens color and rejuvenates tile appearance.

•

Surface Dull: Marshall Mfg. Co. (New York) now has a Pre-Color Spray that dulls the surface of glossy prints, magazine pages, etc. It's also used to de-gloss pages for coloring with oil color pencils and to reduce glare on silverware and other brightly finished objects for photographing. Six-ounce pressurized sprayer can sells for $1.50.

•

Tanners: Car-Skin Products (Flemington, N.J.) has a "car-skin" reconditioner and wax. The reconditioner removes road film, tree sap, etc.; the wax is a follow-up that gives a high polish. Retail price is about $1.50/pt.

PATENTS

Fire Fighter: A coating that forms a fire-resistant, intumescent layer when heated has been devised by Vita-Var Corp. (Newark, N.J.). The new paint —pigment, nonvolatile vehicle components—contains 10% (minimum) raw isano oil and 5% (minimum) polyamide or formaldehyde resins (U. S. patent 2,754,217).

•

Antirat: A rat-chasing additive for packaging materials is a new development of Columbia Southern Chemical

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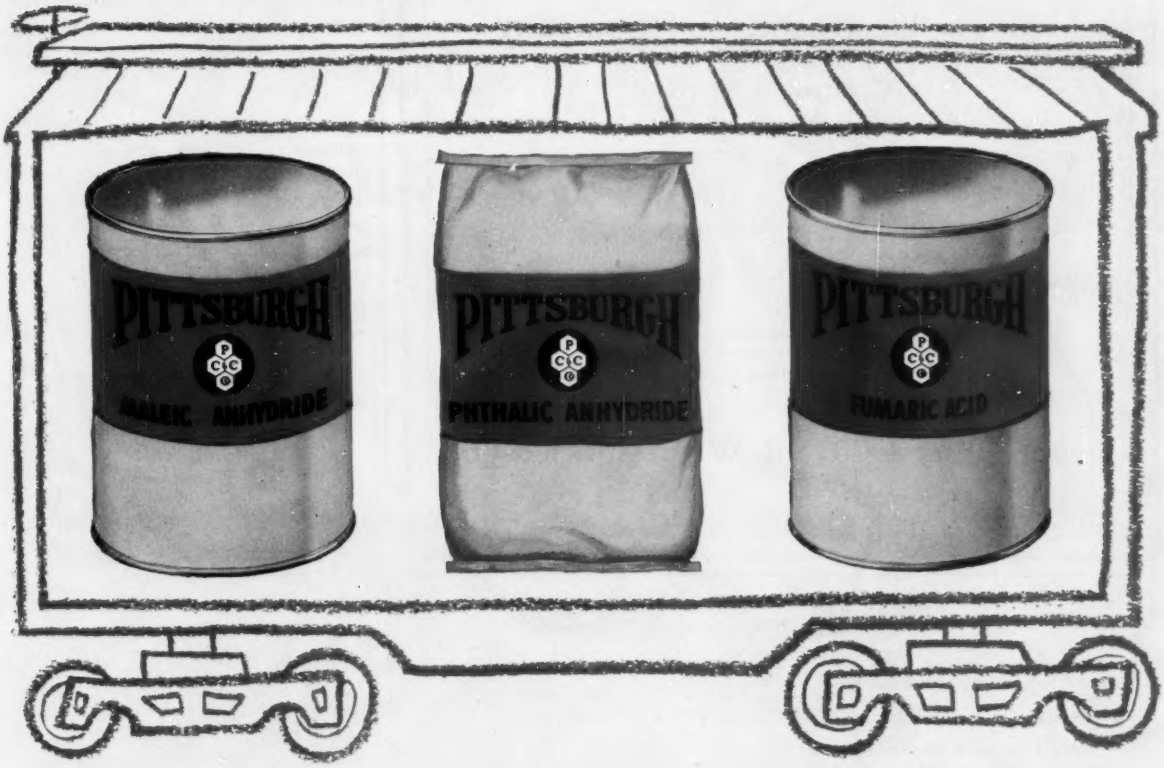

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SPECIALTIES

Corp. (Barberton, O.). C-S suggests treating the material with a concentrate of isopropyl pentachlorophenyl carbonate (U.S. patent 2,754,229).

•

Safe and Clean: Latest antiseptic-soap combination to come out of Monsanto's research labs is one made with 1-3% of 4-chloro-*a,a'-bis* (2-hydroxy-3-chloro-5-methylphenyl)-2,6-xylenol (U.S. patent 2,749,314).

•

No Blaze: For treating cellulosic textiles to give combustion resistance, Du Pont has developed a process involving aqueous monobasic acid solutions of titanium and tervalent antimony, diluted with suitable organic solvents (British patent 748,165).

Electric Antifouling

ELECTRICAL METHODS of reducing seawater corrosion of metal ship hulls aren't new, but Henry Burkey of Hollywood, Calif., claims he has a way to put a related technique to work halting marine growth on the hulls. "Electrification" of the hull plate, he says, causes a thin, flint-hard protective coating of minerals in the sea to form on it (some test plates are shown). This prevents plant and animal marine life from attaching to the steel, also halts corrosion.

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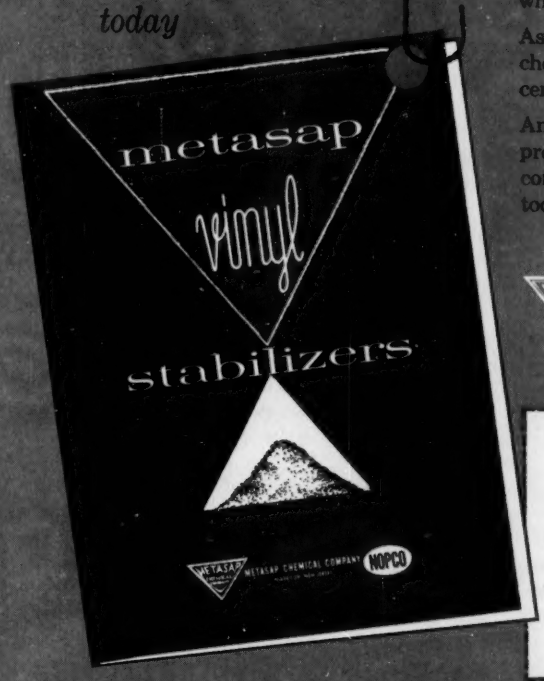

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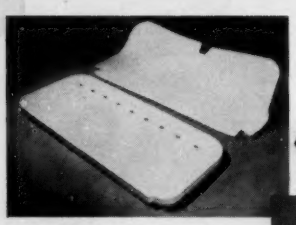
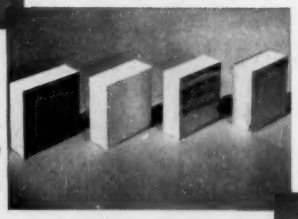


for automobile use

for rigid panels



or in combination with other materials
(leather, carpeting, vinyl, etc.)

Fast-Growing Isocyanate Pace-Setters

At first glance, U.S. isocyanate producers seem to have been on a plant-building spree that has led to a fantastic excess of capacity; right now only about 5% of existing capacity for this chemical—most of which goes into flexible foams—is needed to meet current demand. Yet to all outward appearances, the industry is unperturbed.

In a special market analysis for *CW*, Joseph Winkler, of American Collo Corp., highlights the future prospects of urethane foams and plastics, helps justify the industry's conviction that these outlets will soon provide adequate markets for all the isocyanates that now-available facilities can turn out.

Combined isocyanate capacity of Du Pont, Mobay and National Aniline reportedly totals some 70 million lbs./year; in addition, Carwin and Westvaco can produce several million pounds more, and there's a good chance that other firms may soon join the list of producers.

Compare this with an estimated consumption this year of only about 4 million lbs. of isocyanates for the manufacture of approximately 10 million lbs. of urethane foams.

Foams Expand: But the '56 urethane output is only a good start. Says Winkler: "Within a very few years, the production of urethane flexible foams will reach about 100 million lbs./year (the amount *CW* previously forecast for 1960—*March 10, p. 62*); and consequently about 30 million lbs. of isocyanates will be consumed for this type of foam."

In the same period, consumption of isocyanates in the manufacture of urethane adhesives and coatings—though less definite and harder to predict—will probably rise to at least 5 million lbs./year.

Solid (bubble-free) elastomeric urethanes for tire treading, sheets, and casts will consume 10 million lbs./year more; and the so-called polyether foams—based on 1,4-polybutylene glycols—will take 5 million lbs./year of isocyanates.

By the time output of flexible urethane foam reaches 100 million lbs./year, an additional 10 million lbs./year of isocyanates will be required for (1) improving natural and synthetic rubbers used for coatings and adhesives, and (2) for improving epoxy and epoxy-polyamide types of adhesives and coatings.

The combined demands of these upcoming markets for isocyanates come pretty close to full utilization of the present total production capacity of the three main producers. And these estimates do not include the manufacture of rigid and semi-rigid foams, which, in Winkler's opinion, have the greatest potential, provided that a very inexpensive "active polymer" becomes available; such a polymer would replace the special types of highly branched polyesters now used for this purpose.

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Price Problem: The polyesters currently used in rigid and semirigid foams are priced at about 50-55¢/lb., and most could probably be reduced to a low of 40-45¢/lb. On the other hand, the lowest price likely for toluene diisocyanates by 1959-60 is about 65¢/lb.

Consequently, the cost of raw materials for the manufacture of rigid or semirigid foam will not drop below 50¢/lb. But this price may not be too high when the materials are used in the aircraft industry for foaming-in-place applications, so this part of the urethane market may consume an additional 5 million lbs./year of isocyanates.

However, the largest prospective consumer of rigid and semirigid foams is the home construction industry; hundreds of millions of pounds could be used either as prefabricated self-supporting or reinforced sheets and panels or as foamed-in-place materials.

But the home construction outlet can blossom only when an active polymer-diisocyanate compound can be made available at 30-35¢/lb. (or when a cubic foot weighing 2 lbs. costs 60-70¢/lb., and the very light types of insulating foams weighing 1.2 lbs./cu. ft. cost only 35-40¢/cu. ft.).

Meanwhile, urethane producers are pushing developments that may reduce costs still further. For example, toluene diisocyanate price may drop to about 50-55¢/lb., provided that (1) all producing plants are operating at full capacity, and (2) that instead of utilizing pure toluene diisocyanate, the main polyisocyanate material will also contain 10-20% 2,4,6-toluene triisocyanate. Such mixtures would be cheaper to make, already show promise as satisfactory materials for rigid and semirigid foams.

Because prices much lower than 40-42¢/lb. for polyesters are unlikely, substitute materials may be developed. Three possible types that could be sold in the 10-20¢/lb. range are: polyethylene or polypropylene glycols, technical water-free castor oil, unsaturated fatty oils.

In fact, foams made from compounds consisting of polyethylene glycol and castor oil are already a reality—some firms are now marketing such ready-to-use products for foamed-in-place uses. The prices—close to $1/lb.—are high, but may drop if large markets for these rigid and semirigid foams emerge. However, there is still some question about the ability of these types to withstand humidity and the seepage of rain and ground water.

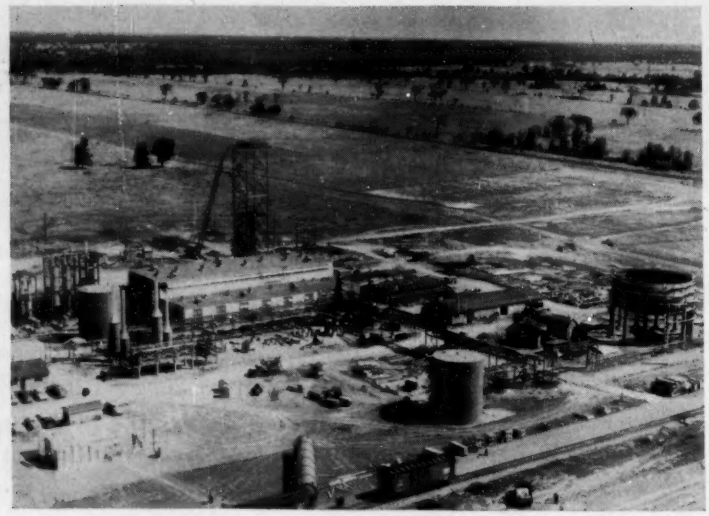
Other proposed methods of utilizing polyethylene and polypropylene glycols—to give moisture-resistant rigid and semirigid foams—include cross-linking with epoxy resins. Should a heavy demand stimulate large-scale production, such copolymers, it's claimed, could be marketed at prices a full 30% below the least-expensive polyester-type active polymer.

Inexpensive foam materials can also be made from technical castor oil, would eventually cost no more than 40-45¢/lb.; and still in the laboratory stage are other formulations, e.g., those made from fatty oils, which provide dark but strong and water-resistant rigid and semirigid foams; these latter types of foamed-in-place materials should cost no more than 30-35¢/lb. when produced on a large scale.

Meanwhile, the recently announced commercial availability of two new isocyanates (Carwin's polyaryl polyisocyanate, and n-butylisocyanate), and Mobay's substantial price reductions on isocyanate and polyester resins, underscore the industry's fast-paced, competition-bucking plans (*CW Market Newsletter, Aug. 25, p. 83*).

(Carwin's PAPI, reportedly, will increase resiliency and raise the heat distortion point of flexible and rigid urethane foams, while Mobay's price cuts and service concessions should broaden the use of isocyanates in the company's Mondur/Multron surface-coatings system.)

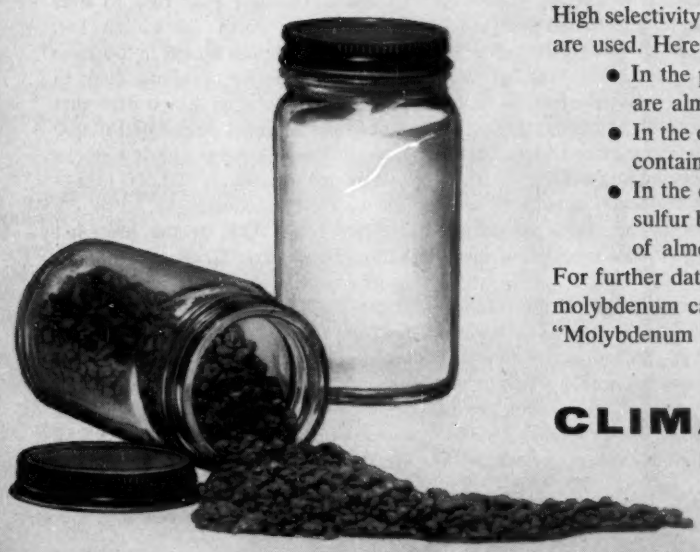
In all, there seems to be plenty of reason to agree with industry observers who predict that the isocyanate business will, in the next few years, grow into its now-over-capacity shoes.



More Ammonia for Canada

SPROUTING of ammonia-making facilities—almost a dozen new plants are expected to push total U.S. capacity to some 4.9 million tons by next year—apparently has spread to Canada. That country's largest anhydrous ammonia plant ($9 million to build; 200-tons/day capacity, *see above*) is just about ready to come in with initial production. It's Canadian Industries Ltd.'s venture at Millhaven, Ont., which will aim output toward pulp and paper petroleum refining, explosives, ag chemical, and other Canadian ammonia consumers.

Moly catalysts are selective



High selectivity is provided in reactions where molybdenum catalysts are used. Here are three examples:

- In the production of formaldehyde from methanol, yields are almost quantitative.
- In the oxidation of aliphatics to maleic anhydride, the product contains no by-product maleic or fumaric acid.
- In the desulfurization of petroleum stocks, the carbon to sulfur bond is selectively hydrogenated with recoveries of almost 100%.

For further data on these reactions as well as many others using molybdenum catalysts, write Dept. 28 for our bulletin "Molybdenum Catalysts for Industrial Processes."

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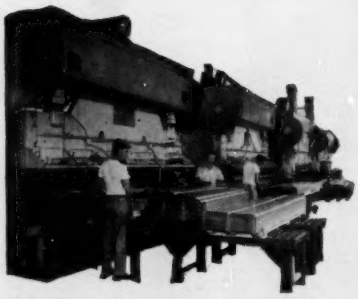

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Shore Up for Italian Sulfur

International scrambling for world sulfur markets may be intensified when proposed Italian cost-cutting mine modernization begins to pay off.

SULFUR PRODUCERS in the U.S., Mexico, Canada and other areas have an important stake in some new developments in Italy and Sicily that could spell even keener competition for world markets—and soon.

The Sicilian Parliament has already given its preliminary approval to a bill that could give Italian producers a potent weapon in their attempt to recapture once-held world sulfur outlets. The bill provides for an appropriation of $20 million for these purposes:

- To enable the Mediterranean mines to produce at lower costs.
- To make possible the selling of sulfur stocks at competitive prices on foreign markets.

Key to the $20-million program: bringing existing mining equipment up to date—a move that's expected to increase the sulfur yield from Sicilian ore, decrease production costs substantially.

Sulfur, of course, is a traditional Italian export. For the last several years, however, such exports have been undergoing a period of chronic depression, which began when the immense output of American sulfur mines began hitting world markets.

In spite of all previous efforts by the Italian government and by Sicilian regional authorities to step up modernization of the mines, Italian sulfur production costs often exceeded American by 50%. The differences, of course, had a skyrocketing impact on selling price of the Italian material.

The international price drop in sulfur after the Korean War led to an even more serious situation in Italian sulfur circles. Exports in '54, for example, practically came to a standstill; and at the beginning of '55, stocks of raw sulfur reached a record of some 330,000 tons. The crisis pushed the government to take exceptional measures.

The Italian Ministry of the Interior, jointly with the Treasury, authorized the Ente Zolfi (Sulfur Corp.), to which producers are required by law to deliver their raw sulfur, to equalize, in the case of the 330,000 tons of sulfur stocked, Italian export prices with those of American competitors.

Since then, Italian raw sulfur has been sold on world markets at 22-28,000 lire/ton f.o.b. (about $35-45 at current exchange rates), while the Ente Zolfi has paid Italian producers from as much as 44,000 lire/ton ($70) to the current 31,000 lire (about $50).

The corporation was also authorized to pay Italian exporters of refined sulfur a grant-in-aid of 11-20,000 lire/ton ($18-32) to allow refined material to adjust to the world price level.

Other measures, too, are being taken to narrow the producers' profit-production cost spread. One relates to stocks and is applicable to all Italian mines; another relates only to newly mined sulfur and applies solely to Sicilian producers.

The first provides for a government grant of 10,000 lire/ton on the 330,000 tons of stocks accumulated in the last few years, plus a grant of 1.15 billion lire ($1.84 million), to be distributed among Italian sulfur mines on the basis of production costs of each.

The second measure, enacted by the Regional Sicilian government, allows grants of 8-10,000 lire/ton on new sulfur mined (not forming part of the stocks) in Sicily.

These steps seem to be paying off for the Italian sulfur industry. Exports of raw sulfur—by far the major item of the trade—last year rose to over 41,000 tons, worth 1.2 billion lire. And new quantities mined in '56 have all been placed by the Ente Zolfi; in fact, the corporation has orders that exceed the expected output of 180,000 tons. Probable results: existing stocks—now down to about 300,000 tons—will be further reduced.

After completion of the proposed $20-million modernization program, Sicilian sulfur producers anticipate a shave in production costs by 27-30,000 lire/ton ($43-48). The cuts not only are expected to make possible disposition of the Italian surplus at prices quoted on world markets, but will also accent today's elbowing for world markets.

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IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Market
Newsletter

CHEMICAL WEEK
September 8, 1956

This week, there's unanimity on glycerine prices—both synthetic and refined natural are pegged at the lower level established by Shell Chemical early last week. Within hours after the posting of the new price on synthetic material, soapers were notifying customers that natural would also be selling at 28¢/lb. (tanks). Dow, the only other synthetic producer, followed suit a couple of days later.

Prime reason advanced for the cut is that the market has been overstocked lately, but trade observers also cite the recent influx of very low-priced crude offerings from foreign sources as adding pressure on domestic tags.

Prices of isocyanate-derived products are going down, too, reflect recent drastic price cuts on the raw material (*CW Market Newsletter, Aug. 25*).

Latest item to benefit from the isocyanate price cut (plus reduced manufacturing costs due to increased demand) is Isomelt polyurethane wire enamel (a solderable enamel) made by Schenectady Varnish. Effective Sept. 1, prices were reduced a full 30%.

On the other hand, it's fairly certain that most chlorine customers will be paying higher prices next month. Indication (*CW Market Newsletter, Aug. 11*) that such a move was likely is confirmed by Columbia-Southern's announcement that its contract schedules on liquid chlorine will be revised upward, effective Oct. 1.

C-S prices, including a modest $2/ton increase: $63/ton in single-unit tank cars; in multi-unit tank cars (four or more annually to one destination), $81/ton. Prices apply f.o.b. sellers' cars at C-S plants. The company will freight-equalize in individual cases when necessary to meet competition.

What about caustic soda and soda ash prices? Chlor-alkali sellers are mum on fourth-quarter plans, but some market followers are willing to make a small wager that tags on both these items will emulate the chlorine hike. At any rate, if producers are contemplating such action, you'll hear about it before next week. Contract users have to be notified before the 15th of the month.

Outlook for ash demand in the coming months is optimistic, and this plus higher manufacturing costs reportedly have at least one major producer ready with an increase announcement. The caustic boost, if it comes, will simply underline the trend toward a fourth-quarter firming of prices on a raft of chemicals.

•

Canada now has its own lithium producer. Dominion Magnesium is reportedly the first Canadian firm to produce the metal on a production basis—though some lithium metal has been made previously on a test basis.

Dominion's entry into lithium production follows closely the recent completion of a lithium grease plant by Surpass Petrochemical (*CW, July 21, p. 116*), further points up the growing threat to U.S. exporters of lithium and lithium chemicals.

A new additive for diesel and fuel oils is now going into commercial production at Shell Chemical's plant at Martinez, Calif. But don't look for it on the market just yet; so new it doesn't even have a name, the product is undergoing evaluation tests before it's offered to buyers, won't become available until about the end of this year.

No prices are being announced now; the additive's chemical composition is secret, of course—it's described only as a "non-ash dispersant that prevents agglomeration."

Though it will go into all Shell diesel and fuel oils, there will be plenty for other buyers, too, because the product is being made with existing equipment that's capable of meeting any likely increases in demand.

At the same plant, Shell is completing a second expansion of ethyl amyl ketone capacity to meet anticipated demands for use as a high-boiling solvent for nitrocellulose lacquers, vinyls.

An original market development unit able to make 100,000 lbs./month went onstream in mid-'52, was followed by full-scale commercial production in mid-'55. The current expansion doubles the capacity to a "multimillion-pounds/year" rate.

Midwest buyers of synthetic detergent intermediates and similar organic chemicals will soon have a new source close at hand. About to go onstream is a new half-million dollar "automatic bulk plant" under construction by Ultra Chemical Works (Chicago).

And there's a new source for plasticizer buyers, too. Full-scale production of phthalic anhydride-type plasticizers is under way at Reichhold's Elizabeth, N.J., and South San Francisco plants; the firm also plans near-future plasticizer production at Detroit; Los Angeles; Jacksonville, Fla.; Charlotte, N.C.; Ballardvale, Mass.; Argo, Ill.; Azusa, Calif.; Kansas City, Kan.; Tacoma, Wash.; and Tuscaloosa, Ala.

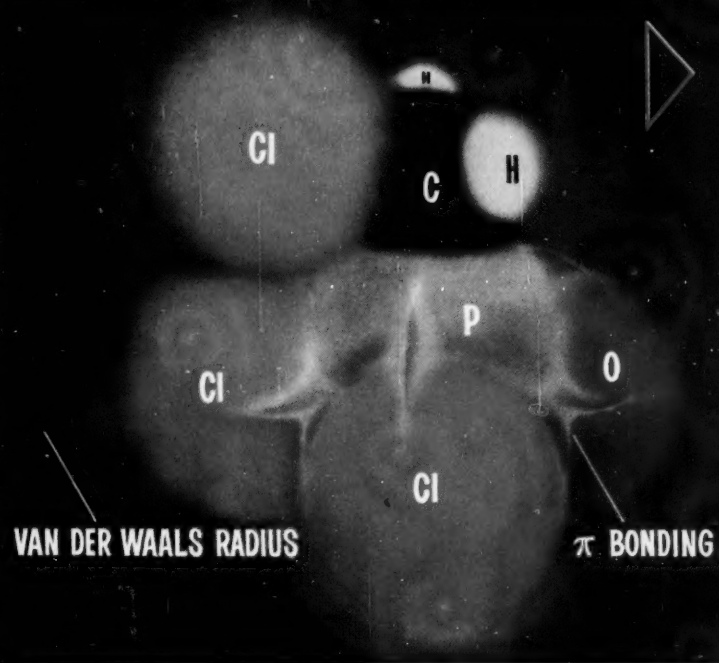
Incidentally, U.S. plasticizer consumption is climbing rapidly toward a 350-million-lbs./year level. About 75% of all plasticizers are used in vinyl resins, 10% in cellulose products, 5% in nitrocellulose lacquers, and the remaining 10% in nonplastic applications, e.g., gasoline additives, rocket fuels, jet engine lubricants.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending Aug. 31, 1956

	Change	New Price
UP		
Ammonium bicarbonate, dom., drms., c.l., wks., 100 lbs.	$0.50	$7.00
Ammonium bicarbonate, drms., l.c.l., wks., 100 lbs.	0.50	9.00
Ammonium chloride, tech., bgs., c.l.. wks.. 100 lbs.	0.50	5.75
Sodium nitrite, bbls., c.l., 100 lbs.	0.50	8.50
DOWN		
Glycerine, syn., tks., dlvd.	$0.02	$0.28
Glycerine, syn., c.l., drms.	0.02	0.295

All prices per pound unless otherwise stated.

STEPPINGSTONES TO TOMORROW'S PRODUCTS

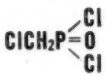


New concepts lead to new products. This is the latest concept of the molecular structure of (chloromethyl)phosphonic dichloride showing pi-bonds and van der Waals radii. Keeping up with new concepts is part of Monsanto's effort to produce efficiently scores of new

Organophosphorus Compounds

Here are NEW CHEMICALS FOR INDUSTRY ready for commercial evaluation:

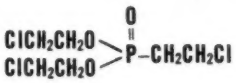
(CHLOROMETHYL)PHOSPHONIC DICHLORIDE



Colorless liquid, irritating odor. Stable to 250° C. Soluble in most organic solvents.

Hydrolyzes readily to phosphonic acid. Phosphorus-bonded chlorines extremely reactive—almost equal to PCl_3; carbon-bonded Cl is less active. Example: the phosphorus-bonded chlorines react with alcohols to give a diester; carbon-bonded chlorine will then undergo alkaline hydrolysis to give a hydroxy phosphonate. Methyl and ethyl diesters readily prepared. Aminates to a secondary amine, $HN(CH_2PO_2NH_4)_2$. Aniline salt and dianilide have been prepared.

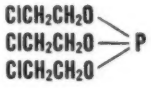
Bis(*beta*-CHLOROETHYL) *beta*-CHLOROETHYLPHOSPHONATE



Colorless liquid above 37° C. Soluble in acetone, methanol, benzene. Insoluble in hexane, water. B. p. (5 mm.) 170.2° C. Readily supercools.

Resists hydrolysis, but hydrolyzes or chlorinates to half ester more readily than simple phosphonates. With HCl and heat, yields 2-chloroethanephosphonic acid. May be dehydrohalogenated to give *bis*(*beta*-Chloroethyl) Vinylphosphonate, which can be polymerized to viscous resins. Reacts with PCl_5 to give ester chlorides which react with aniline.

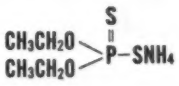
Tris(*beta*-CHLOROETHYL) PHOSPHITE



Pale-yellow liquid. Soluble in acetone, benzene, methanol with some interaction. Insoluble in water, hexane. B. p. 112-115° C. (2.5 mm.).

Undergoes many of the reactions typical of trialkyl phosphites including thermal rearrangement (Arbusov); reacts with alpha-halogenated carbonyl compounds to form vinyl phosphates. Possible uses: lubricating-oil additive, antioxidants, wetting agents, flameproofing agents.

AMMONIUM O, O-DIETHYL PHOSPHORODITHIOATE



White-to-tan crystalline solid. Readily soluble in acetone, EtOH and water. Unstable in aqueous acid solutions.

Hydrolyzes slowly in water. Decomposes near 165° C. Acid is readily prepared by treatment with HCl. Both the acid and salt forms are highly reactive. Possible uses: insecticides, photographic chemicals, oil additives.

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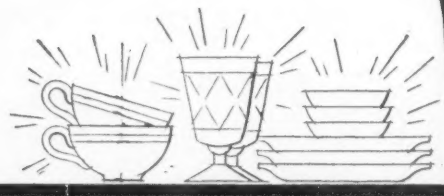

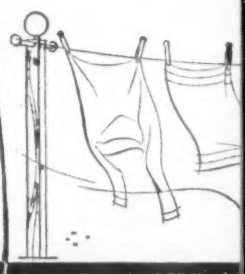

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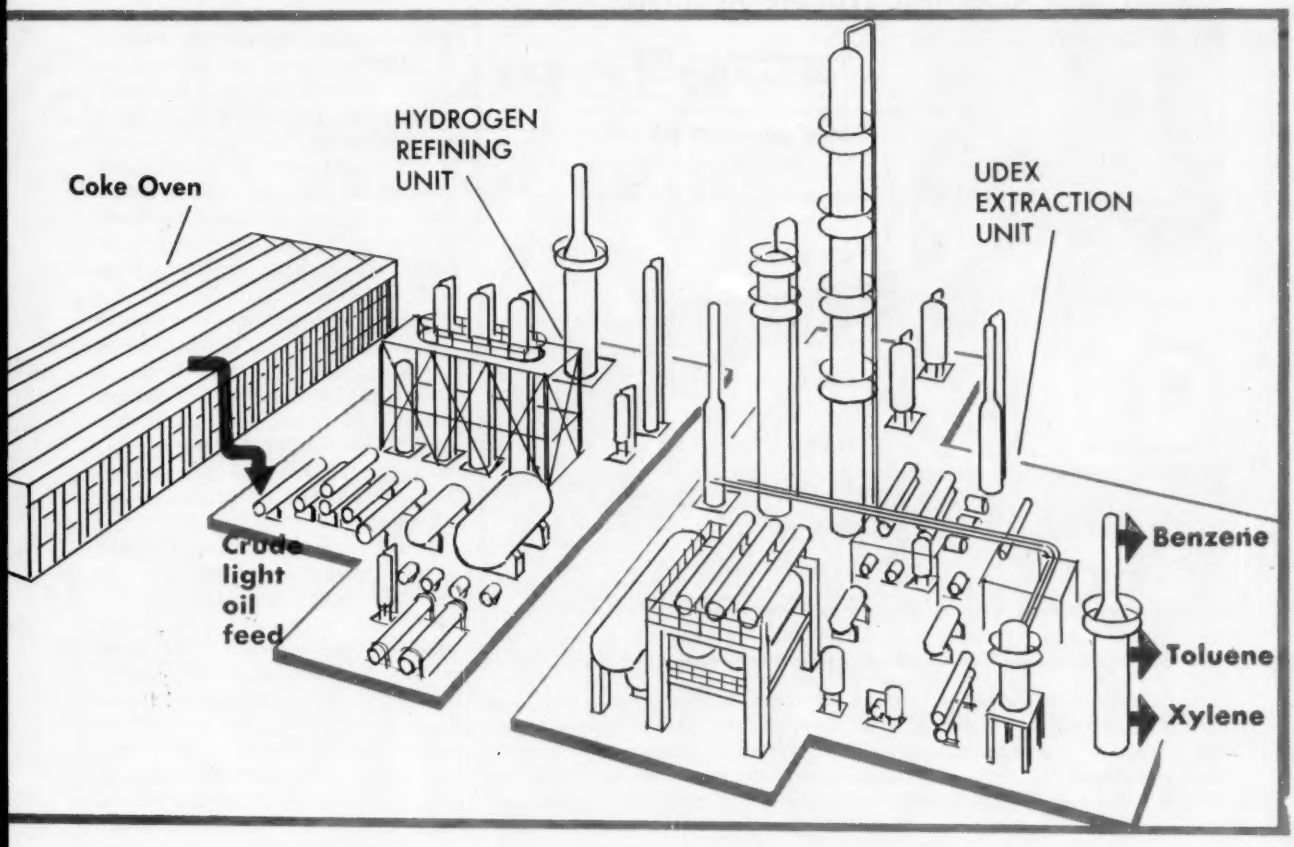

Change in Coal Chemicals Clean-up

For several years coal chemical producers have watched petroleum-derived benzene, toluene and xylene grab off an ever-increasing share of the growing aromatics market. Today they're aiming to counter this competition with two of the oil processors' own refining techniques—hydrogenation and Udex extraction. Both Jones & Laughlin Steel Corp. and U.S. Steel are readying plants to upgrade aromatics from coke-oven light oil (CW Technology Newsletter, Aug. 18).

J&L's $2-million-plus plant at Aliquippa, Pa., is due onstream early next year. Key processing units will be a 55,000-gal./day version of Esso's Hydrofiner, a 56,500-gal./day installation of Universal Oil Products' Udex extraction system.

Late in '57, U.S. Steel will begin similar operation in a multimillion-dollar plant at Clairton, Pa. The USS plant will handle an estimated 150,000 gal./day of light oil. The process: Koppers' Super-Refining, based on a German process developed by Badische Anilin- & Soda-Fabrik and Scholven-Chemie.

Though it's had no takers as yet, Blaw-Knox is also offering an altered version of the BASF—S-C method (*CW Technology Newsletter, Jan. 7*). Designed by Germany's Lurgi, this modification, says B-K, is chiefly concerned with processing know-how rather than with major equipment changes.

Process Economics: Besides making a big improvement in product purity, boosters of the hydrogenation-extraction processes say they offer cost advantages that may make acid-washing of coal aromatics obsolete. According to Badger Mfg. Co. (Cambridge, Mass.), J&L's prime contractor, the Aliquippa plant will appreciably reduce operating costs, especially those attributable to loss of chemicals, acid sludge disposal.

Of course, operating costs will vary with many factors—size, throughput, feed composition, hydrogen source, utilities, etc.—from plant to plant. Koppers estimates that refining and extraction costs will range from 2-5¢/gal. of light oil feed. And capital costs (exclusive of product fractionating facilities) are expected to run from about $1.5 million for a 10-million-gal./year plant to $4 million for a 50-million-gal./year installation.

Hydrogen Sources: One processing requirement that will be determined largely by local conditions is the source of hydrogen supply. Coke-oven gas normally contains 45-55% hydrogen, could be an economical choice. But it must be cleaned before use to

ESTIMATED UTILITY REQUIREMENTS* OF KOPPERS PROCESS

Material	Requirements per 1000 Gals. Light-Oil Feed
Coke-oven gas (52% H_2)	27,000 cu.ft. of 580 Btu. (gross)
Return gas (Credit)	19,000 cu.ft. of 740 Btu. (gross)
Catalyst	0.75 lb.
Glycol	3.2 lb.
Clay	7.5 lb.
Steam (150 psig.)	8,000 lb.
Service water	36,000 gal.
Process water	100 gal.
Electricity	220 kwh.
Fuel gas	2.5 million Btu.

*Exclusive of fractionation of benzene, toluene, xylene; recovery of residual oil; purge-gas scrubbing.

remove nitric oxide and oxygen, which would react with gum-forming light oil components to foul the catalyst and plug equipment.

Use of coke-oven gas is one of the features stressed by B-K for its Lurgi modification. But this advantage applies mainly to smaller plants, i.e., those with capacities below 70,000 gal./day. Hydrogen partial pressure is the determining factor, so use of coke-oven gas roughly doubles operating pressure. This becomes a main cost consideration as the size of the plant gets larger.

Koppers claims that the original BASF—S-C process can utilize coke-oven gas, includes this source in its estimate of utility requirements for the process (*see box*). Too, Scholven has operated its German plant on coke-oven gas, although it reports that pure hydrogen is preferred.

That USS will bypass coke-oven gas is mainly a question of economics. It's cheaper to generate hydrogen right at the refining plant than to pipe in coke-oven gas from a distance. USS says that two methods of hydrogen generation are under consideration. Likeliest source: natural gas, which the plant is already using in large quantities.

J&L's Hydrofining process is sufficiently versatile, says Esso, to use any of several hydrogen-rich gases. However, it admits that coke-oven gas would require a cleaning operation for which it's made no provision. J&L plans to use an ammonia dissociator to supply hydrogen at start-up, will later switch to pure hydrogen.

Aiming for Purity: Since improved petroleum-refining techniques have all but eliminated the price advantage once enjoyed by the coal aromatics, competition has been decided largely on the basis of product purity. And present acid-washed coke-oven aromatics, with their usual amount of paraffin adulterants and 100 ppm. or more of sulfur, are no match for petroleum aromatics, which contain less than 1 ppm. of sulfur.

Purity requirements now rule out the coke-oven products for many critical uses. (One example: the production of adipic acid for nylon.) And a growing number of uses in the manufacture of plastics, synthetic detergents, insecticides, paint and aniline dyes are swelling the demand for improved grades of benzene, toluene and xylene.

Though the hydrogenation-desulfurization processes being adopted by coal chemical processors differ in some details, they all employ the same basic principle. Crude light oil fed to each is reacted with hydrogen in the presence of a catalyst to convert deleterious sulfur compounds (particularly thiophene) into hydrogen sulfide. Following hydrogenation, the products are separated from unreacted hydrogen-bearing gas, and sent to a stripping column for H_2S removal. Unreacted gas is purged, recycled to the reactor feed stream. Neither J&L nor USS is ready to disclose full operating details of their abuilding plants; but both of the processes have previously been well described.

In Esso's Hydrofining—the simpler of the two systems—crude feed is heated, combined with a hydrogen stream and fed to a fixed-bed reactor. Normal conditions are not severe, range from 400-800 F, 50-800 psig., depending on feedstock composition. Common catalysts are metal oxides on alumina.

The Koppers process differs mainly in pretreatment of the feedstock. In the USS plant, preheated light oil crude will be pumped first into a holding vessel in which high-boiling, gum-forming components can be polymerized and removed. Light oil vapors from this stage will then be combined with hydrogen, heated to 320 C and fed to the catalytic reactor. Catalysts used in the original German process were oxides and sulfides of metals such as tungsten-nickel and cobalt-molybdenum.

Degree of conversion of the impurities, says Koppers, is a function of hydrogen concentration. In general, hydrogen partial pressure must be approximately 300 psig. to assure elimination of sulfur. Under this condition, the exothermic reaction takes place at about 350 C.

Extraction processes at both plants will employ a Udex system. Desulfurized light oil will be pumped to an extraction column in which the non-aromatic components will be removed by diethyleneglycol-water solvent. The aromatic-solvent mixture will then go to a stripping column for recovery, recycling of the glycol.

After a water wash, condensed aromatics will be clay-treated to produce a low bromine number. Conventional fractionation follows to separate the benzene, toluene and xylene fractions. Tests conducted in Esso's Hydrofining pilot plant and in Scholven's German installation indicate that the finished products will match the purity of

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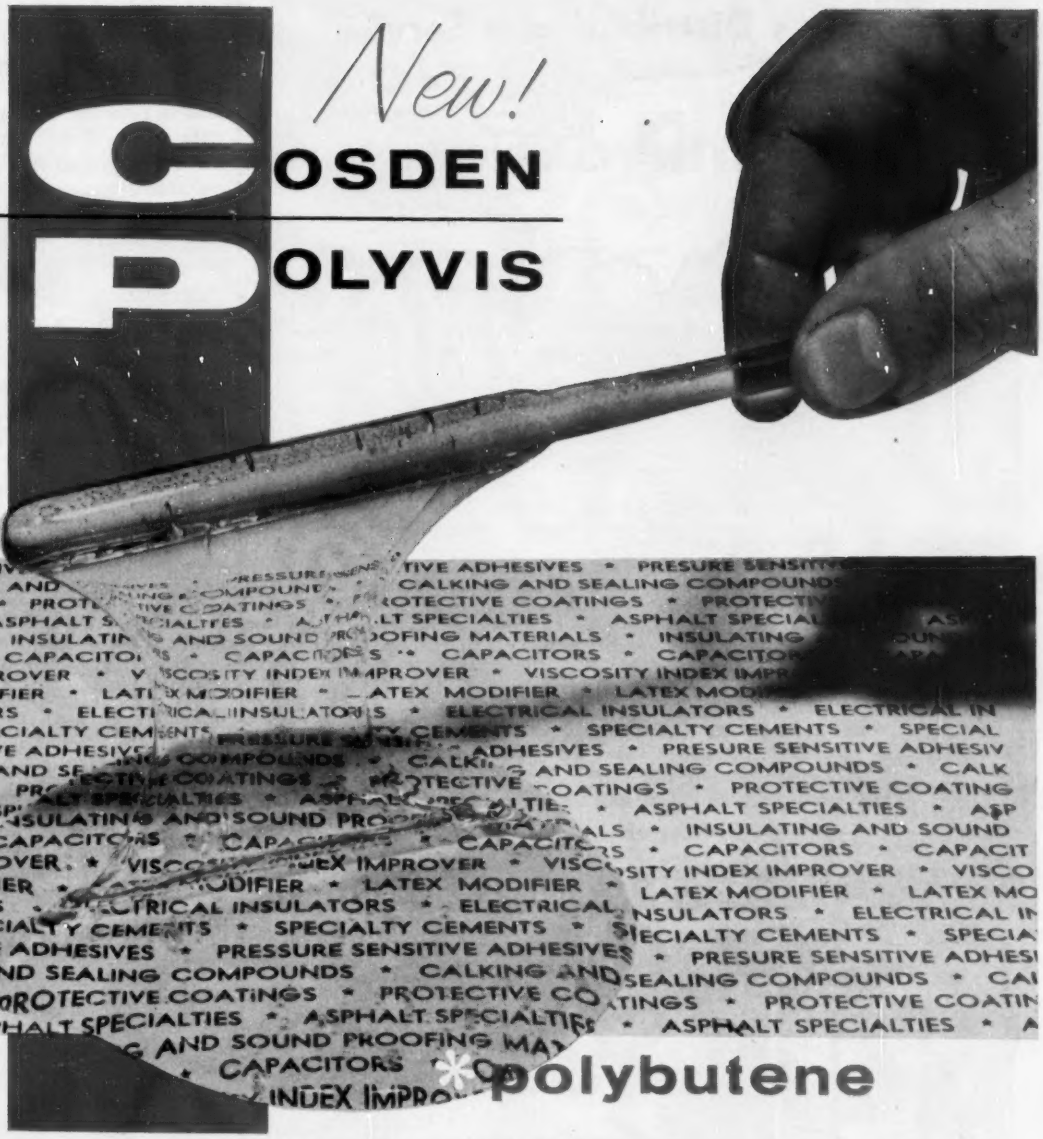

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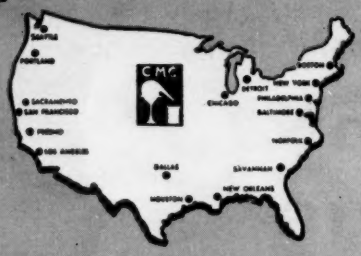

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More to Come: While the hydrogenation-desulfurization processes appear to have the edge, they're not the only routes to high-purity coal aromatics. Many coal chemical producers are still trying to decide which route is best for them. But now that J&L and USS have made their moves, others in the field may be forced to make theirs.

Borohydride Pulping

Scientists of Australian Paper Manufacturers Ltd. (Melbourne) have come up with a new process that's said to increase alkali resistance and alpha-cellulose content of chemical pulps. Key to the improvement is the use of a weak alkaline solution of sodium borohydride to chemically reduce the cellulose to a highly stable form.

Chief advantage of the borohydride treatment is its characteristically low yield of aldehydic types of oxidized cellulose. When conventional chlorine bleaching is used to remove the colored constituents of wood (mainly lignin), oxidation of some of the cellulose content to aldehydic cellulose is unavoidable. And since this form possesses a relatively low resistance to alkali, subsequent alkaline treatment to dissolve the modified lignin causes considerable degradation of the cellulose fibers.

By chemically reducing the aldehydic groups to hydroxyls, sodium borohydride very effectively increases the alkali-resistance of highly purified pulps. And though the gain in alpha cellulose content raises the price of chemical pulp to manufacturers of viscose rayon, cellophane and cellulose ethers, says APM, the yield of cellulose derivatives is correspondingly higher.

What's more, pulps produced by the new method offer viscose rayon producers another processing advantage—easier, more efficient purification. Before it's made into regenerated fibers, cellulose must be freed of xanthanones (one of the coloring components of wood). And xanthanate solutions from borohydride-stabilized pulps are much easier to filter off, reports APM, than are those derived from unstabilized pulps.

APM holds an Australian patent on the process, foresees potential applications wherever chemical resistance is the primary pulp requirement.

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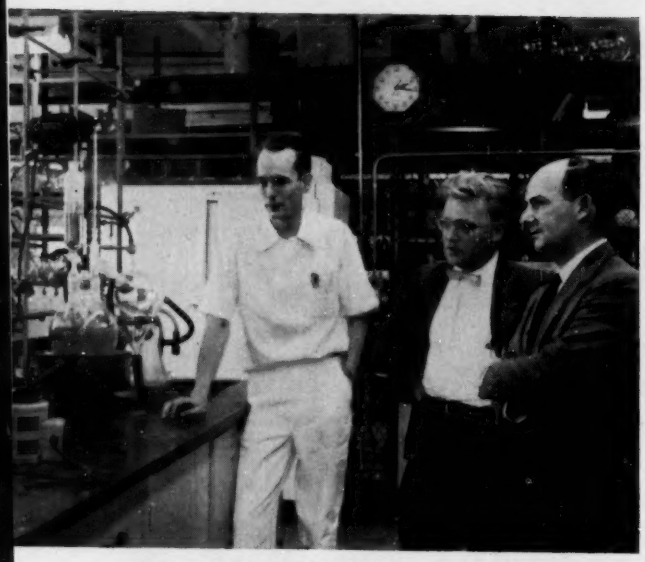
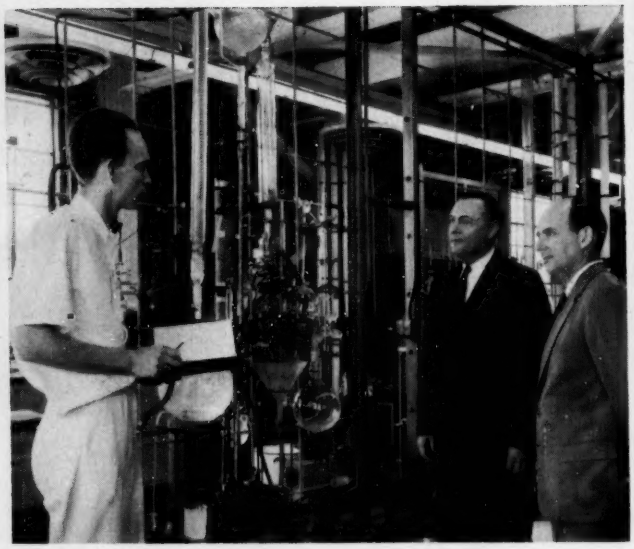


LABORATORY UNIT shows planners* the way.



GLASS PREPILOT plays key role in process design.

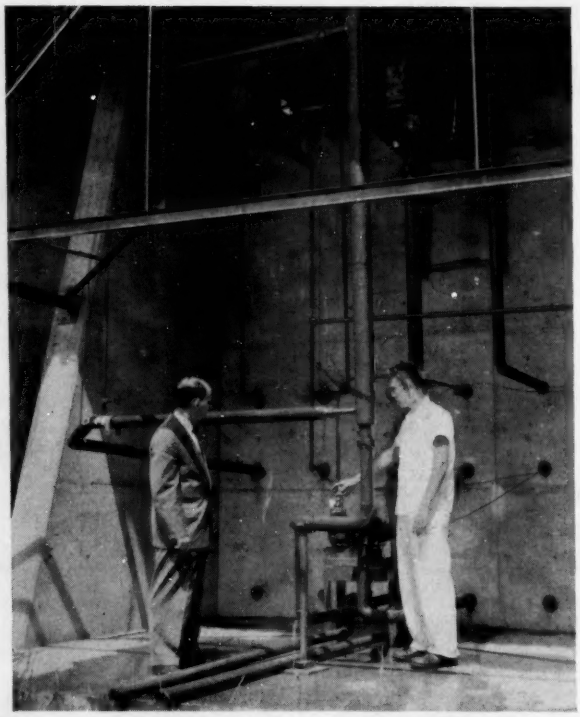
Three steps to waste control

See-Through Pilot Solves Waste Poser

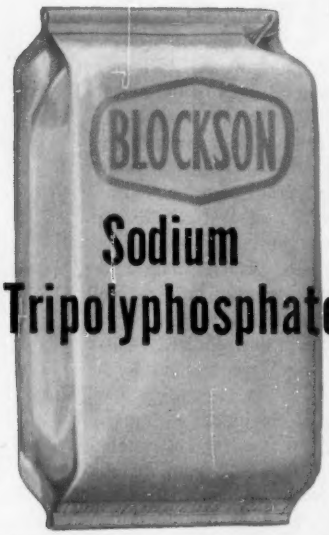
When Eaton Laboratories Division of the Norwich Pharmacal Co. (Norwich, N. Y.) planned the recent fivefold expansion of its nitration plant, it took more than the usual ounce of prevention to overcome potential pollution headaches. Accustomed to working out pharmaceutical processes in glass equipment, Eaton engineers successfully employed the same technique to solve an obstinate waste disposal problem. Result: a continuous waste evaporation unit permitting the recovery of 5,000 gal./month of 99+% glacial acetic acid that might otherwise have been dumped into the nearby Chenango River.

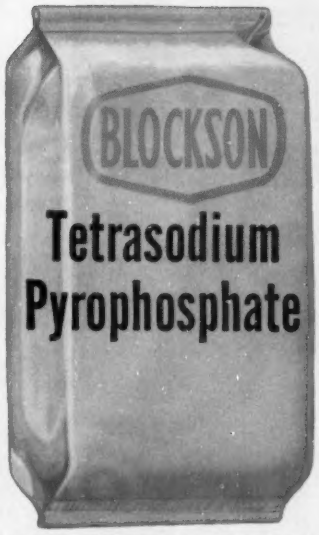
Source of the troublesome waste is a nitration process that converts furfural into nitrofurfural diacetate—the intermediate for many of Eaton Laboratories' nitrofuran drugs. If dumped untreated into the stream, the waste's 30%

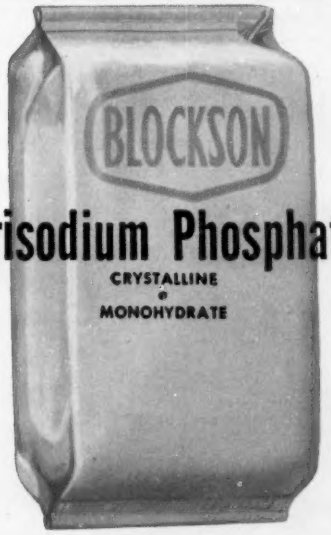
*Pictured above: Assistant Research Director Hayes *(right)*, Unit Leader Paul Seehausen *(left)* with Charles O'Keefe, Chief of Process Development Section *(center, in top left photo)*; with Norwich President Bengert *(center in top right photo)*.

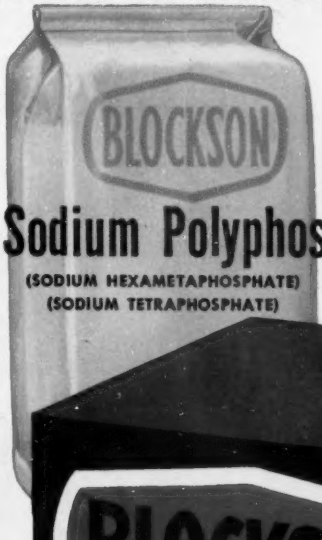


STAINLESS PILOT proves plan, provides scale-up data.

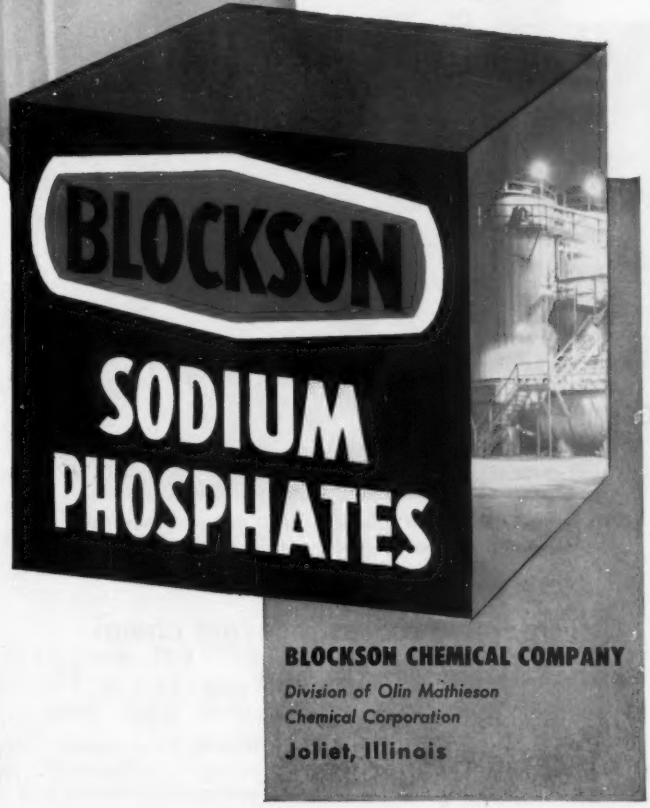








Sodium Polyphos is Blockson's brand name for a water soluble Glassy Sodium Phosphate with the desirable characteristics of Sodium Hexametaphosphate and Sodium Tetraphosphate.



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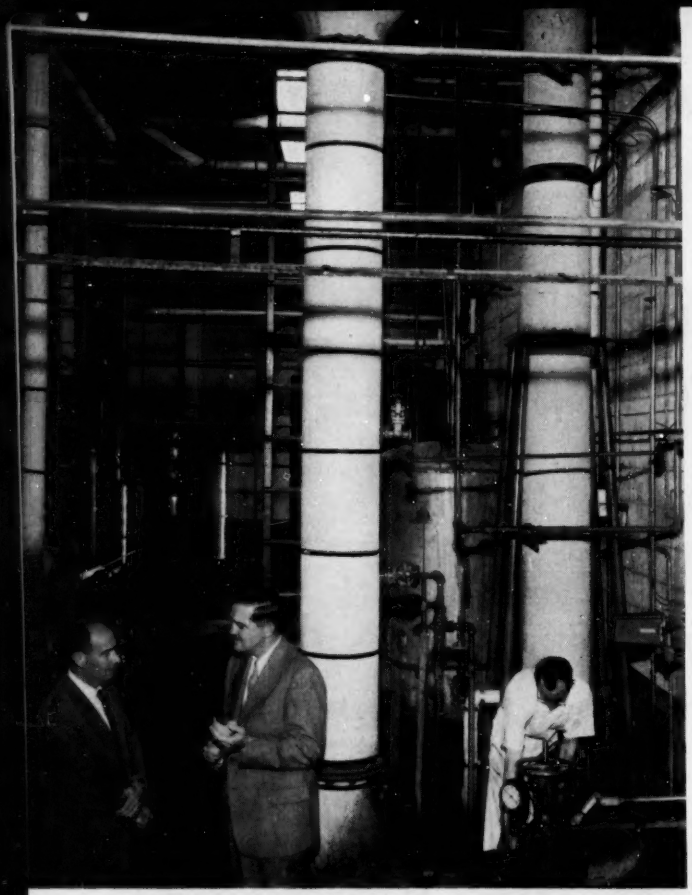
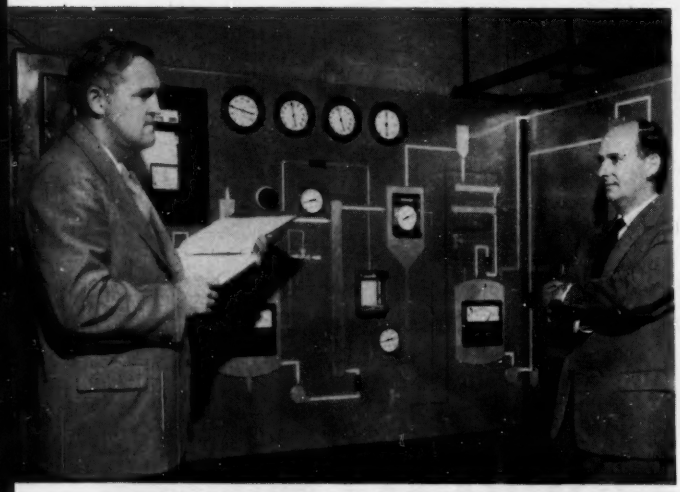


PROJECT COMPLETED: Waste evaporator is onstream.

acetic acid content would seriously deplete the water's supply of biological oxygen. And to further complicate matters, the residue is a gummy resinous product that's too thick to be handled in the type of equipment conventionally employed for recovering acetic acid from wastes.

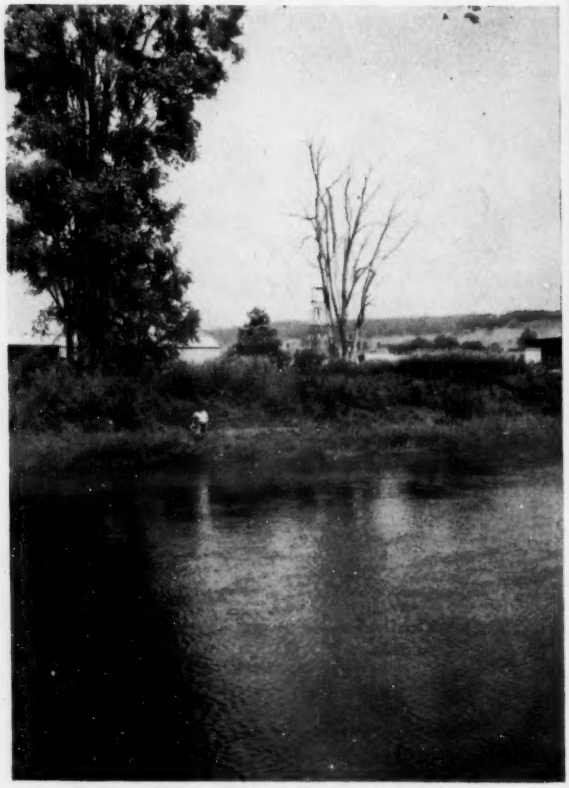
Even though the glacial acetic acid is recoverable in commercially usable form, preliminary studies of the problem indicated that the required treatment would not be a profitable operation. Initial plans for expanding the nitration process included a liquid-liquid countercurrent extraction system for stripping the acid from black waste. But it was designed to handle clear aqueous solutions, not the thick resinous tar produced at Norwich. What Eaton Laboratories needed was a pretreating step that would prevent the gummy waste from clogging the system.

Three to Make Ready: To solve the tricky process riddle, a research and development team headed by Kenyon Hayes, Norwich Pharmacal's assistant



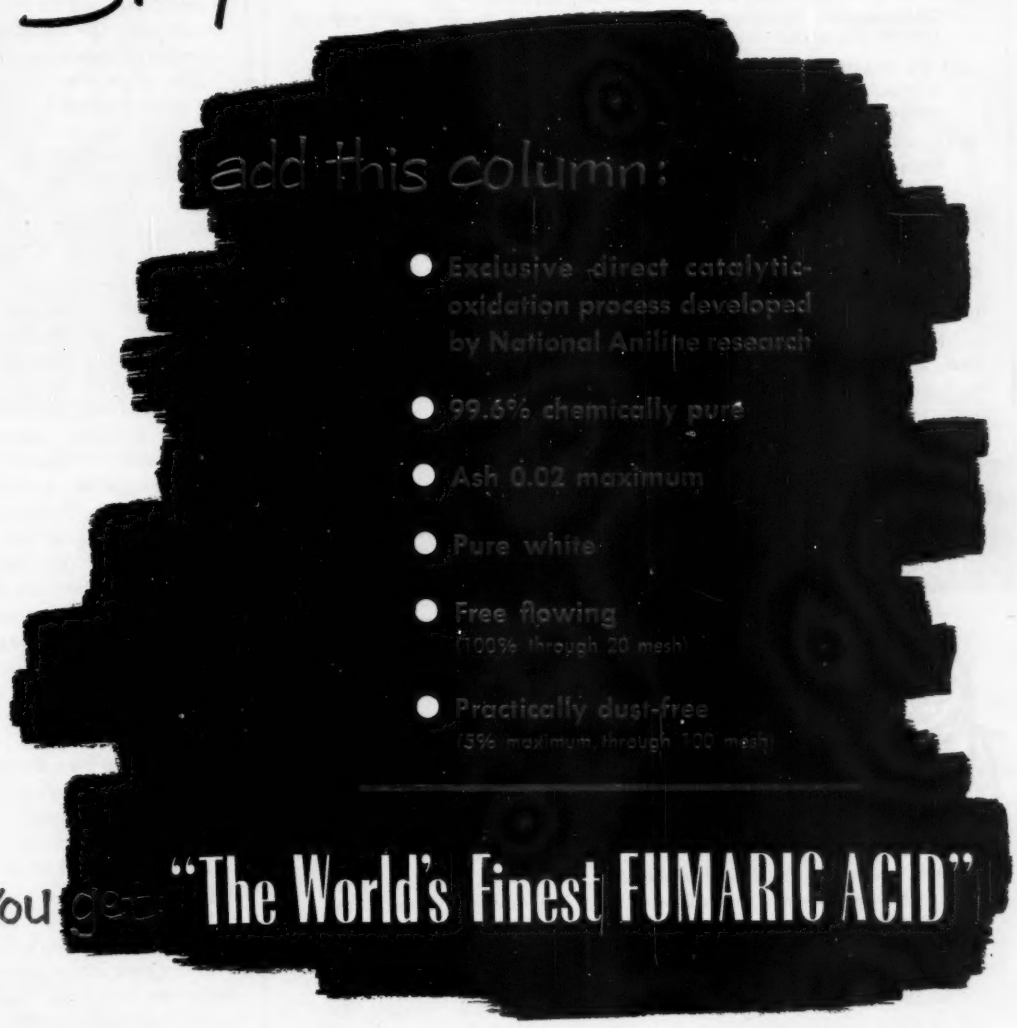
PROJECT DIRECTOR HAYES (right) and plant superintendent O. P. Schuessler check critical controls.

Continuous process recovers chemicals, sidesteps pollution



EATON LABS' AIM: For the Chenango River, a lighter pollution load.

It's Simple Arithmetic!



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director of research, made full use of the company's three-step development program customarily employed in all new product development. The plan involves the construction and operation of an all-glass pilot unit as an intermediate step in the scale-up from bench-scale lab equipment to a conventional stainless steel pilot unit.

The visual observation afforded by the glass prepilot system, says Hayes, was a big help in overcoming the problems of handling the gummy black waste. Trouble spots at which the material tended to collect and clog were easy to find and correct. And because much of the equipment was made in the laboratory's own glass-blowing department, modification and refitting of the glass apparatus was faster, simpler than rebuilding steel processing units.

The glass unit also makes it possible to spot potential operating hazards. In this case, for example, it disclosed the formation of an explosive residue when sulfuric acid was used to pretreat the waste, indicated that the use of nitric acid would preclude this hazard in the production-scale evaporator.

Four to Go: After 18 months of development and piloting, the continuous evaporation unit moved into the fourth and final stage—actual operation on the production line. Here's how it works.

Black waste from the nitration units is pretreated with nitric acid, aerated, and fed to a heat exchanger. The hot mixture is introduced into a flash chamber, where 95% of the aqueous acetic acid content is vaporized, separated from a black tar that flows into a settling tank. Vapors from the flash chamber pass into a condenser, which discharges gum-free dilute white acid to the countercurrent extraction system for recovery of glacial acetic acid.

No Pollution Pressure: Despite the lack of waste disposal restrictions (the Chenango River has not yet been classified by the N.Y. State Conservation Dept.), Norwich President George Bengert sees the wisdom in preventing unnecessary contamination of the stream. An influx of various types of industrial plants into the surrounding area is almost certain to alter the Chenango's status. And when it does, the company feels, pollution preventive measures taken today will be a big help in meeting tomorrow's tighter controls.

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Drum Tilter: A drum tilter that will allow one man to handle loads of up to 750 lbs. in a standard 55-gal. drum is a new offering of Heppenstall Co. (Pittsburgh). Drum can be rotated through a full 360 degrees by a worm drive operated by a handwheel.

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Plastic Coating: A. Gusmer, Inc. (Woodbridge, N.J.), has developed a new epoxy-resin application process for lining large tanks. Called Gusco Plastic Cladding, the process uses a new type of heated spray gun that proportions, mixes the liquid epoxy resin and hardener before atomization. Heat replaces the usual solvents. By special formulation, coatings of 100% solids, averaging 0.015 in./coat, can be applied to steel, concrete and wood at rates up to 500 sq. ft./hour, claims Gusmer. To assure process accuracy, hardener and resin are different colors, give third color when mixed.

•

Shutoff Alarm: Damol Corp. (Philadelphia) now offers a safety shutoff and alarm for automatically controlled processes that, it says, requires no sensing elements or electronic circuitry. Dubbed the Damol Impulse Monitor, the device operates from the input signal to a process controller, can be used on any process where heat-, pressure- or flow-control is an on-off, 2-position or pulsing type of control mode with reasonably uniform input.

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Refrigeration Aid: The OSM oil separator-muffler now available from Heat-X, Inc. (Brewster, N.Y.) silences refrigeration system noises, simultaneously separates oil entrained with hot gas from the compressor. The unit features a positive-action velocity-pressure mechanism that opens only when compressor is running, closes of its own weight when compressor stops. Built to ASME specifications, OSM units come in capacity ranges of 1 to 75 tons F-12, 1 to 100 tons F-22.

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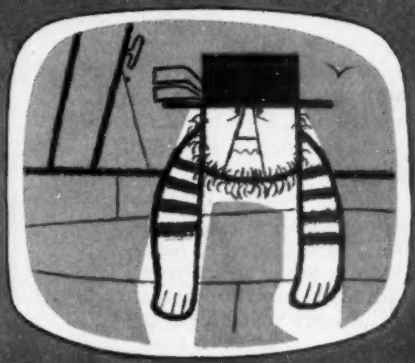

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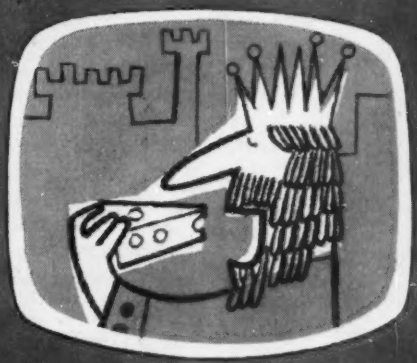

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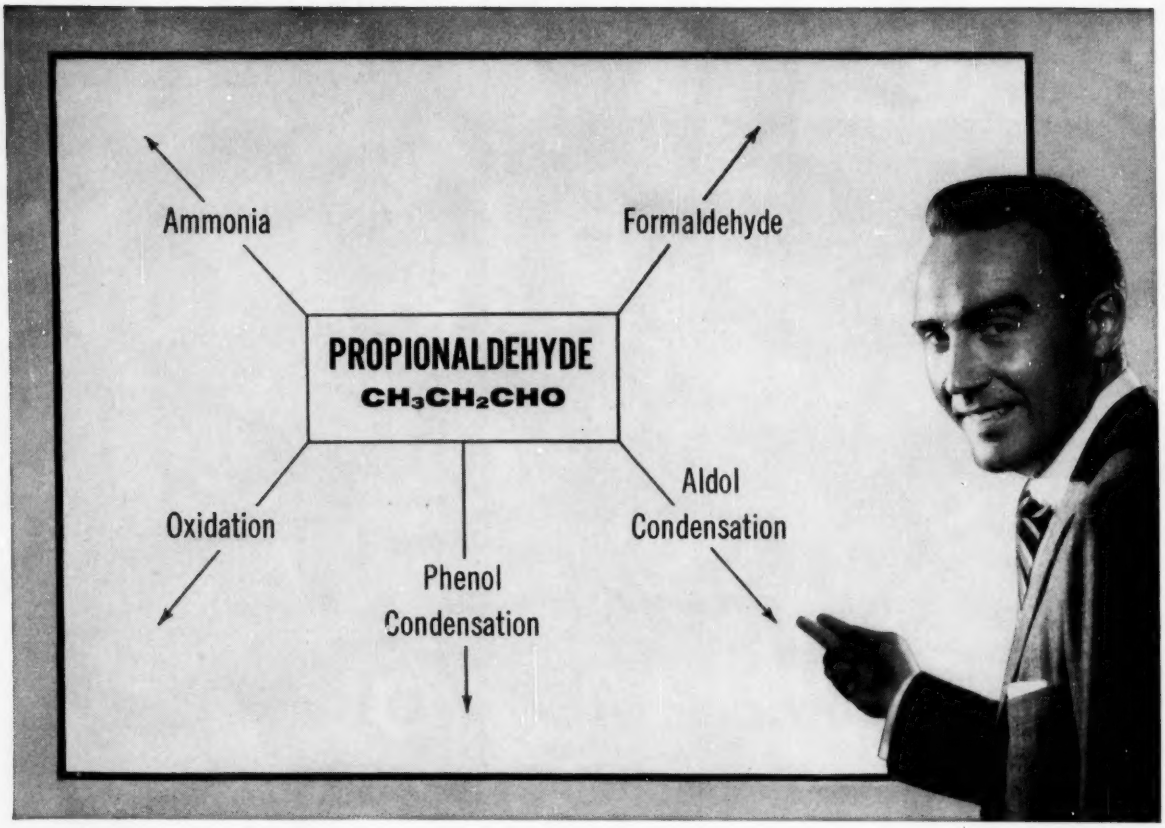

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